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General Articles

"GRASS DISEASE" IN HORSES*

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"Grass disease," "grass sickness" or "grass fever" is a peculiar disease found in horses of all ages but chiefly, it is believed, confined to younger animals. The name originated from the fact that the disease appears during the grazing season, with most cases in June and July, when grass is at its optimum state of growth. Whether the name "grass disease" is the most suitable one or not is doubtful, but in the present state of our knowledge of the disease I am of the opinion that it is one which describes the condition best.

HISTORY.—The disease was first reported in Forfar in 1909 and ever since then has been recognised as quite a specific disease. It is highly probable that it made its appearance some years before 1909, but no records of the occurrence of this condition were kept and the chances are that until then it was not recognised as an entity. Some of the older practitioners in the districts where the disease is prevalent can recall that more than 30 years ago they were getting deaths in horses during the grazing season which they attributed to some form of colic and have no hesitation in saying now that a large percentage of these cases were undoubtedly cases of so-called "grass disease."

GEOGRAPHICAL DISTRIBUTION.—This is peculiar in respect of the fact that it is virtually confined to the eastern seaboard of Scotland, from Caithness in the north to Fife in the south and cases have been reported further south in the northern counties of England. A few cases have been reported in other parts of the country, but unlike the new centres of infection in the eastern seaboard, these other outbreaks have been sporadic and succeeding years have failed to show that the disease has established a foothold. Because of this factor I am sceptical of the truth of the assertion that the disease has actually been found in these parts, knowing as I do how confusing the symptoms of a case may be to the uninitiated, particularly if the case resembles the subacute variety. Certain districts have had a very heavy incidence, particularly eastern Ross, Morayshire, Nairnshire, Aberdeenshire, Kincardine and Forfar. The disease takes on the same characters, no matter where it is found and there has been no marked difference in the types of cases found in these districts; rather has there been a general difference applicable to all, *viz.*, as the years pass by there is a preponderance of milder cases, fewer cases of the very acute type being seen.

When I mentioned that the disease was confined to the eastern seaboard, some of you might have desired to ask, but what is the eastern seaboard and how far does it extend inland? Sometimes it extends inland for 50 miles. This inland extension is usually along the fertile valleys, glens and straths and in most cases follows the various rivers practically to their source in the hills.

At one time it was firmly believed that the disease was contracted only by those animals grazing on rich arable pastures and particularly those pastures into which foreign grass seeds had been introduced. That was why it was thought at one time that the disease was due to the ingestion of alsike clover. This has been entirely disproved; in fact, it is peculiarly true that the disease is found amongst horses grazing on all manner of vegetation, from the best artificial pastures right down the scale to stretches of country where there is little else than heather, bracken or gorse. The worst district I have encountered is the Morrich Moor in eastern Ross, which is a tract of country composed of sand with practically no vegetation.

SUGGESTED AETIOLOGY.—Various theories have been suggested as to the possible causes of "grass disease" and various lines of investigation have been adopted; all with practically no success. It might be useful to survey the various lines of investigation now.

As I mentioned previously, the disease was first reported in Forfar in 1909 and as you know that county is composed of land in a high state of cultivation. About that time farmers were becoming alive to the advisability of using grass seed mixtures containing foreign grasses for the improvement of their pastures and also of applying artificial manures, often of foreign origin, to the land *in lieu* of and often in conjunction with the ordinary farmyard excretions. Alsike clover was one of the grasses and was a particular "rage" at the time, so naturally it came in for a good deal of incrimination. However, experiments to produce the disease

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naturally through feeding the clover failed entirely to establish the fact that it contained anything of a toxic nature.

Then the Great War intervened and "grass disease" enjoyed a rest, but after the War some Aberdeen workers, notably the late William Brown, Professor of Veterinary Science at Aberdeen University, and Dr. Tocher, Analyst to the Highland and Agricultural Society, saw some analogy between the symptoms exhibited by horses with "grass disease" and those described in horses suffering from botulism and advanced the theory that "grass disease" and botulism were one and the same disorder. Aided by grants from the Highland and Agricultural Society, they conducted an investigation of the disease and ultimately published their results, which seemed to prove that their hypothesis was correct. They were able to produce typical symptoms by feeding the toxin of *Bacillus botulinus* to suitable subjects. A toxin-antitoxin was prepared for immunisation and issued to veterinary surgeons in the affected districts with instructions for use. Certain farms with a bad history were selected, half the horses were inoculated and the other half kept as controls. The results were not very encouraging.

These researches of Brown and Tocher received a great deal of publicity in the farming and public Press and it was left to the late Professor Gaiger, of Liverpool, then Principal of Glasgow Veterinary College and Chief Investigator of the A.D.R.A., to disprove their results. Gaiger did this in no uncertain manner and gradually the botulinus theory of the origin of "grass disease" died a natural death.

Gaiger and Dalling, of the A.D.R.A., at that time were conducting investigations on behalf of that body and were not able to demonstrate anything concrete as the causal factor. These researches have been maintained at Moredun, but so far nothing material has accrued; I understand, however, that the association's investigations are continuing.

Some years ago Dr. Russell Greig, Director at Moredun, believed that a green insect, *Sminthurus viridis*, had some connection with the production of the peculiar symptoms of the disease. He arrived at this supposition in the following way. He had an intensive search made of "grass disease" pastures in various parts of the country to collect grasses and insects on the grasses and soils. After examining his data he was struck by the constancy of the occurrence of the insect *Sminthurus viridis* in his collected material and was actually able to produce typical symptoms when feeding the insect to suitable animals. I heard him advance this theory towards the end of a "grass disease" season and he was to continue investigations the following year. From the non-appearance of positive results we may conclude that the line of investigation did not turn out as anticipated. Now Dr. Gordon, of the A.D.R.A., is investigating the disease on the supposition that it is an entero-toxaemia caused possibly by *Cl. welchii* type D (Wilsdon).

A popular idea amongst practitioners about the causal factor was that some of the intestinal parasites of horses may have some connection with the disease, particularly the roundworms *Strongylus equi*, *S. vulgaris* and *Cylicostomum tetracanthum*. It is a well-known fact that these parasites are very common in the "grass disease" districts; in fact, it is comparatively easy to demonstrate them in almost every horse in these parts. In view of that, it is difficult to reconcile the fact that such a small percentage of the total horses contract the disease when the parasites are so endemic. After all, I do not suppose that more than ½ per cent. of all the horses in "grass disease" areas contract the disease annually.

Fungi and toxic plants have been indicted and some people are inclined to the view that the disease is air-borne.

Animals Attacked.—Horses are the only animals naturally attacked, although I once heard a veterinary surgeon of repute say that he had seen the disease in a cow. He was unwilling to describe the symptoms to me. At one time the view was commonly held that only young animals were affected. This is a fallacy, as it is fairly common to find it in very old animals—even those over 20 years of age. However, if one were to take the average age of the horses in "grass disease" areas—in most of these areas extensive breeding is carried on—then that age would be under six years, so great is the number of young animals. Moreover, the young animals are more frequently grazing; in fact, their main diet all the year round is grass. It has been my experience to find a much smaller percentage of acute cases amongst the older animals attacked.

Generally speaking, the disease makes its first appearance for the season towards the last week in April, just when grass is beginning to show signs of growth and when the weather is getting milder. However, if April is particularly warm following on a wet March, then cases appear early and are greater in number. It is singularly noticeable that a spell of warm weather following a wet period brings a large number of cases. The incidence of the disease is usually at its height during June and July and tapers off again until October, when it practically ceases. Nevertheless, one sees cases in the dead of winter, chiefly in colts outwintered. I have had cases during every month of the year except February and March. I have encountered several cases in April amongst farm horses which are housed and fed entirely on a winter diet—except for a few blades of

grass that may be nibbled in the field while working. I have seen two cases in town-fed animals. One had grass carried in to it and the other was a merchant's horse which, although town fed and housed, pulled a van into the country several days in the week. Cases are on record of animals which had no connection with growing pastures.

Period of Incubation.—It is difficult to estimate this. It would appear, however, to be of very short duration, for frequently animals which are working constantly and so are under the closest supervision develop the symptoms very rapidly, often at work. On enquiry it has been found that the animal fed well an hour or two previously. In most diseases, even those with a short period of incubation, there is a time of noticeable indisposition preparatory to the exhibition of characteristic symptoms. This does not appear to be the case in "grass disease."

Symptoms.—Cases of "grass disease" can be divided into four classes, *viz.*, peracute, acute, subacute and chronic.

Peracute.—Here the animal develops symptoms of an alarming nature very quickly and dies within 24 hours. The attack invariably starts, as does a simple colic, with abdominal uneasiness followed by sweating, rolling, tympany, attempts at defaecation and urination. The temperature may be slightly elevated and the pulse is considerably faster than one would expect with the accompanying symptoms. The animal salivates in precisely the same way as a horse reacts to the injection of arecoline and a yellowish-brown discharge appears at each of the nostrils. There are twitchings of the caput muscles and the muscles of the flanks. The sweating becomes profuse and the tympany develops; the pulse rate may be over 100 and the horse shows a very anxious expression as if it had a very sore head. There is a very dirty and injected eye. In most of the peracute cases anti-peristaltic waves can be seen ascending the oesophagus, appearing as if a succession of boluses were being brought up for mastication, as in a cow. This symptom, like the twitching, is quite involuntary and often the animal crouches and squeals as these regurgitations take place. These cases have a complete paralysis of the glottis and are unable to swallow water or food and it is practically impossible to pass the stomach tube. Frequently the animal will attempt to feed or drink and after the mouth is full the food or water is thrown out again and it may make further attempts. Rectal examination reveals the small bowels tympanitic and displaced into the pelvis and the pelvic flexure of the double colon enlarged and impacted. Peracute cases are all fatal.

Acute.—The animal exhibits much the same symptoms as in the peracute type, but they are not so intense. Contrary to what is observed in the peracute type, there are usually periods when little can be seen except that the pulse is high, 80 or over—not what one would be led to expect by the animal's appearance. Soon, however, there is a fresh exacerbation and the symptoms may continue for two or three days, when the animal dies. In a small percentage of cases the chronic type succeeds to this. Animals with the acute type lose condition rapidly and in two or three days may become skeletons of their former selves. After a few hours' illness a characteristic line develops on the abdomen in spite of the fact that defaecation is in abeyance. This acute wasting is seldom evident in the peracute type, as death intervenes rapidly and the acute tympany masks the loss of condition.

Subacute.—The animal may show little more than colicy pains and often on a first visit one has difficulty in arriving at a positive diagnosis, particularly if none of the specific symptoms is present. However, even in the slightest cases the pulse rate will at once give one the indication that something more is wrong than the appearance of the animal indicates. One symptom on which I used to place a lot of reliance was a puckering of the nostrils—just what one would expect to get in an animal limiting the amount of cold air being introduced to inflamed nasal membranes. A marked reddening of the nasal mucous membranes might be noticeable. Usually sooner or later one of the outstanding symptoms appears, *viz.*, nasal discharge, salivation, twitchings, paralysis of the glottis. Very often the injection of arecoline hydrobromide brings on some of the marked symptoms. A subacute case may recover completely after a few days or may go on to the chronic form, with continuous wasting.

Chronic.—The term "chronic 'grass disease'" is applied to the chain of symptoms an animal exhibits which has passed from the acute or subacute attack of the disease. The animal gradually and progressively emaciates until literally it is skin and bone—and often although it continues to feed to some degree and defaecates fairly normally. When paralysis of the glottis sets in the animal should be destroyed forthwith on humanitarian grounds and the only chronic cases in which treatment should be continued are those where the animal is able to accept nourishment of its own free will. Chronic cases sometimes continue for months and eventually get down through exhaustion and die or have to be destroyed. Occasionally after a long period of wasting and for no apparent reason, chronic cases begin to mend with amazing rapidity. These cases seem to have been on the increase during the last ten years.

Post-mortem Changes.—*Peracute.*—Very often a ruptured viscus and a gastritis and an enteritis are present. Sometimes congestion of the lungs exists, due to fluids and food arriving at the lungs from regurgitations from the stomach. There is severe impaction of the large bowel with material often of the consistency of concrete, and when an attempt is made to remove the impacted mass the lining membrane comes with it. When the head is sawn vertically, to exhibit the nasal cavities and pharynx, there is noted an intense inflammation of the membranes of the head and particles of food are often found there.

Acute.—The lesions are much the same as in the peracute type, but often there is little pathological evidence to be found.

Subacute.—Little *post-mortem* evidence of disease is discoverable.

Chronic.—There is extreme emaciation. The bowels are little altered, but seem to have shrunk and there is a peculiar "tacky" discharge from the bowel mucosa with a sickly odour. The membranes of the head often show a chronic inflammation and thickening and there may be patches of pneumonia in the lungs.

Treatment.—There is no drug known which seems to exert any favourable influence. Treat the symptoms, but when these include paralysis of the glottis no treatment should be attempted. The only manner in which an owner can protect himself is to insure his animals against death from "grass disease."

Various methods of treatment have been advocated, and at this point it might be advisable to discuss one that has been accorded a good deal of publicity in the Press, *viz.*—Hardie's treatment. This consists of giving the animal 1 to 2 oz. of Cooper, MacDougall and Robertson's non-poisonous cake dip dissolved in about a pint of water and following this with an infusion of broom shoots. I have tried it, not because I believed in it, but simply to test its worth. Farmers talked so much about, it that it was for me to show, if possible, that it had no effect on the symptoms. Hardie also advised its use as a preventative. I used it extensively. He advised dosing before the animals are put to grass and after they are taken in. The dip is a coal tar derivative and it is known that the cresols are soon eliminated from the system, so what good can a dose of medicine like that be against possible future infections? One good thing it does is to disinfect the alimentary canal and expel the ever-present roundworms and in this connection it is a very good routine treatment.

Invariably the method of treatment adopted has been to treat the symptoms as they arise. Occasionally one gets a run of cases recovering and because of that one is apt to claim that the drugs used have exerted some favourable influence, but it is only a matter of time before one is forced to set off on a new line.

For chronic cases various intravenous injections have been tried, *e.g.*, formalin, 1 drachm to the pint of boiled water. I have tried many and if I have a good word to-day for any of them it is for potassium iodide, 1 drachm to the pint. I may point out that it is often a very difficult matter to administer an intravenous injection by the jugular vein in a chronic case of "grass disease." The potassium is given twice during the first week and then once a week afterwards so long as improvement is noticeable.

The main factor in treatment is to give plenty of good, nourishing, laxative food.

Immunisation.—A natural attack gives little immunity, for animals recovered from a previous attack have contracted the disease the following year and again recovered. However, in view of the larger number of subacute cases, as compared with those of the acute type, met with during the last few years, and also of cases which recover, one is led to suppose that probably horses are getting a slight immunity naturally—not sufficient to ward off an attack, but sufficient to avoid a fatal termination. On the other hand, it may simply mean that the infective agent is less virulent.

Conclusions.—The main conclusion I draw is that "grass disease" is a disease in which the infective agent affects the nervous system primarily and the symptoms exhibited are due to certain groups of nerves being impaired. The intestinal stasis and the characteristic alteration in the heart rate suggest that the nervous mechanism of these organs is thrown out of balance. The usual purgatives have no effect on the condition of the bowels. The twitchings suggest some nervous lesion, as also does the inability to swallow, together with the profuse salivation.

There is little doubt that the sensory nerve fibres to the diseased part are affected as well as the motor nerve fibres, for a horse with the peracute form does not exhibit the extremely painful sensations which would be in keeping with the mischief done to the alimentary canal.

To my mind, the intestinal inflammation, when present, is secondary to a peracute stasis which rapidly predisposes the bowel wall to the entry of the ever-present intestinal organisms, which at once assume a pathogenic rôle. The same impairment of the sensory fibres of the nasal and pharyngeal mucous membranes may be said to take place, for often an animal little resents the introduction of the stomach tube by the nasal route when the membranes show intense inflammation and congestion.

The temperature is not constant in "grass disease" and is not a guide as to the severity

of an attack: rather is it a guide to the extent of secondary complications.

The pulse rate is the best index of the state of a "grass disease" patient.

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Discussion

Invited by the President (Mr. Tutt) to open the discussion, Colonel H. J. Holness said he wished to take the opportunity of thanking the members for the privilege they had given to those who were, so to speak, "birds of passage" through the southern counties, in the Army, of regarding themselves as honorary members of the Association. It was a privilege they much appreciated. He also wished to congratulate Mr. Begg on his paper on "Grass Disease." He had always found it very difficult to get a mental picture of a disease in animals merely by reading about it. Actually seeing a case was best of all, but failing that, the next best thing was the opportunity of discussing it with someone who was familiar with the conditions.

"This disease," Colonel Holness continued, "was first recognised as an entity in 1909, but practitioners identified cases they had regarded as colic cases as falling within the definition of the condition, and it would appear to have been in existence for an indefinite time before its specificity was recognised. This is quite a pardonable error, and it is possible that it has occurred at places other than in the east of Scotland. So far as this area is concerned, 'grass sickness' was identified in connection with Salisbury Plain in 1924, and except during four years, cases have occurred in connection with the Plain ever since that time. I was appointed to the Southern Command in April, 1934, and in the spring and summer of that year had to deal with a major outbreak; there was a smaller outbreak last year, but when the animals were withdrawn from what we believed to be the centres of infection no more cases occurred. The lessons we have been able to learn here in this Command are these. The disease is always associated with a change of diet and in Army horses that change has always been one which may be summed up as the addition of grazing or the use of cut grass to the usual diet of stabled animals. We have never had a case in which the use of cut grass or grazing has not had a very strong suspicion of coming into the picture. The second thing we have noticed is that apparently it is a localised condition. During the grazing season, which also happens to be the training season, Salisbury Plain area offers grazing facilities in and around the stables and camp areas, and there are also opportunities for the use of cut grass as an addition to the ordinary Army rations. The Plain is visited at this time of the year by units from other stations for training. At the height of the 1934 outbreak there were probably over 2,000 animals on the Plain, and there was only one unit, and that a very small one, which did not graze or have cut grass, yet except in a fairly well-defined area animals remained free from 'grass disease.' A third point we noticed was that in the affected areas the animals were picketed on lines that had been in use for several previous training seasons, and in order to preserve the grass and also the soil on the Plain, the horse lines were sited on the same ground that had been used in past years.

"With regard to rainfall conditions, I have collected a few details from a local source which may be of interest. For the winter months, September 1st to April 30th, the average for the past ten years is just over 20 inches. In 1933-34, there were 13½ inches; in 1934-35, 21½ inches, and in 1935-36, there were 26·7 inches up to the end of February. I am not a normal resident of these parts, but I should imagine the past two winters have been mild ones. Whether that favours the disease or not I do not know, but some of the writers on this disease consider there is a connection between climatic conditions and the incidence of this disease. The period of incubation has been as low as four days and as long as 14 days. These figures are based upon the length of time animals remained in a suspected area before a case of the disease occurred. In this connection it is of interest to remark that in two of the 1934 cases the unit to which they belonged returned to its home station (Aldershot) by two road marches, a matter of between 50 and 60 miles, and five days after return 'grass disease' was diagnosed—that is, seven days after leaving the Plain.

"I think it will be an aid to diagnosis if you mark well the lecturer's conclusion that this disease is primarily one of the nervous system—the complete abdominal stasis; paralysis (although this may be masked by the intensity of the symptoms due to pain), the extension of the paralysis to include the pharangeal and laryngeal regions, with inability to swallow and absence of irritation of the mucous membranes of the nose and possibly the larynx and trachea (the passage of food or liquid into the lungs normally induces coughing); the twitching of the skin, the sweating and the continued high pulse rate. This idea of the loss of nerve control is borne out I think by the *post-mortem* examination of chronic cases, in which there is a marked shrinkage of the bowels, especially noticeable in the stomach and colon. In one case the capacity of the stomach was reduced to less than one gallon and the third colon had shrunk to one-third of its normal size. Last year it was arranged to have portions of the nerve tissues from chronic cases examined microscopically and for this purpose portions of the brain, the vagus and autonomic nervous system were sent to Lieut.-Colonel Argyle, of happy memory, but his death in the preliminary stages of the examination led to the matter being dropped.

This is an aspect of research which I commend to those who are inquiring into this disease.

"As regards causation, one may, I think, reasonably ask the question as to whether pasture land gets horse-sick or horse-soured, and whether something could not be done by a system of rotational grazing to get the land rid of this. One is reminded of the periodic ophthalmia which affected animals in France. The present theory of the disease being due to an anaerobe—possibly a soil anaerobe—is to some extent borne out by our experience in this Salisbury Plain area. Hay does not transmit the disease and we have Mr. Begg's view that the virulence of the disease shows signs of diminishing, due possibly to a lessening virulence or the developing of some degree of immunity.

"With regard to treatment, in the Army cases are dealt with in isolation, manure is burnt and stables regularly disinfected. Preventive measures consist of intensifying the existing thorough system of forage inspection, the maintenance of a very high standard of fitness and the application of a very high standard of hygiene. Grazing and the use of cut grass is prohibited in affected areas; all cases of colic are reported to the veterinary officer in charge of the unit and cases or suspected cases of grass disease are treated in segregation; open standings that have been occupied by animals affected are dug up to the chalk subsoil or for a depth of ten inches and dressed with quicklime. I cannot say that these measures, which I have every reason to believe were carried out to the limit, were effective. Retreat from the suspected area has so far been the only effective means of reducing the incidence of this affection.

"There are three observations I should like to make in connection with our experience of this disease, that may be of interest. The first is that the standard Army hay net will hold from 20 to 25 lb. of cut grass without undue stuffing. This will probably surprise you, but it is a fact. The second observation is that pending their destruction three horses were fed the previous day with cut green grass, equal quantities of cut grass and hay, and hay only, the hay being of a definitely green-tinged variety. On making a *post-mortem* examination it was by no means a simple matter to decide which animal had received the particular feed scale. The third observation is that one horse which had recovered from the disease in 1934 was wintered away from Salisbury Plain and came back down to the Plain again last year. As soon as this horse was called upon to perform consistent work it rapidly lost condition and was the subject of repeated mild attacks of colic. It was sent to hospital in the middle of June and discharged again at the end of July, and for the first part of the time the clinical proposition was, is this a case of "grass disease" or is it a case of indigestion resulting from the shrinkage of the stomach and large bowel? Four months later I enquired about this same horse and it was then in fair condition, below the unif average and a fickle feeder.

"I referred earlier in these remarks to the advantage of being able to discuss a clinical matter such as this with a man well acquainted with it, and I am going to ask Mr. Begg to give us a little more information as to the line that develops on the abdomen. Is this the line of the rib cartilage that comes into prominence as a result of the shrinkage of the abdomen? Also in his observations on the *post-mortem* examinations on chronic cases he referred to a peculiar 'tacky' discharge from the bowel mucosa. I cannot understand what he means by 'tacky.' Lastly, I would like to ask Mr. Begg to give us some further information as to the nature of the pulse which he regards as of special diagnostic value. I have dealt with the subject mainly in an administrative capacity. Perhaps Major Sparling will tell you more about the clinical features of the disease, as most of the cases were dealt with by him or under his supervision."

Concluding his remarks, Colonel Holness said he thanked Mr. Begg for a most interesting and informative paper, and the President and members of their Society for the privilege of opening a discussion on the subject. The present stage of our ignorance concerning the disease was not good for them as a profession and was not good for the horse as an economic unit of the transportation system of the country. The more questions of this sort were discussed among what he would call the field workers of their profession, the more useful would their contributions be to those who were working at the research aspects. He was all in favour, also, of taking advantage of lay information and lay opinion and when he had been arguing with professional men as to the advisability of laymen entering into their discussions, he was always inclined to point out that Pasteur was neither a doctor nor a veterinarian and Lord Kelvin was not a mariner.

Major P. S. Sparling said that he had been fortunate in seeing a very big outbreak of this disease. At the time he knew nothing about it beyond a few clinical cases of the chronic type. The first case that came into the hospital had been seen by the veterinary officer who had signed it with a big question-mark "Colic?" It appeared to him to be an exceedingly acute case of impaction, and at night he went round to see the animal again. There was then a frothy discharge from the mouth, and he suspected an incorrectly administered chloral hydrate ball, but there were no signs of any burning of the mouth. He got two other veterinary officers to see the animal and one said he thought it was a case of "grass disease." At about the same time another case was admitted (from the same unit) of what looked like ruptured stomach. They studied the text-books but they could not see the usual secondary symptoms of "grass disease." Both horses died within 24 hours and on *post-mortem* examinations being made they certainly looked like cases of "grass disease."

He got into touch with the Army Veterinary School because they had been watching "grass disease" in England for some years. Both cases were confirmed by the School. From his own experience of these cases he could only observe that they could not wish for a more masterly description of the disease than that given by Mr. Begg. It was exactly as they saw it. There was one other case of interest to which he might perhaps refer. It came from one of the units in which "grass disease" had been diagnosed, but it was not supposed to be that disorder. The horse was in poor condition and had been stomach-pumped for worms three days before admission into the Veterinary Hospital, for convalescent treatment. It was still purging on arrival. In 48 hours it developed symptoms of "grass disease" and died 96 hours later of that disease. Until then he had firmly believed that the disease was digestive in origin, and that the cure was a matter of purgation. In the diagnosis of the acute type of "grass disease" he relied on rectal examination, and the use of the stethoscope to confirm the absence of all peristaltic movement—the condition appeared to be one of complete stasis of the whole digestive apparatus.

Major R. M. Bamford confessed that he had nothing very useful to add, but thought that in view of his recent appointment to Larkhill, he might meet with some cases in the early summer and before then he was going to have a talk with Mr. Begg. The latter had not mentioned the symptom of snoring. His own acquaintance with or knowledge of the disease had been obtained purely from text-books, but he seemed to recall that a soft but very audible snore, rather like the rumbling of a train, was one of the symptoms, and he desired to ask Mr. Begg if this was so.

Mr. J. B. White enquired if Mr. Begg thought that "rushed-up" grass brought on peracute cases. Would such a condition of growth of the grass favour "grass disease" at all? Mr. Begg had mentioned the recovery of chronic cases. Did that mean absolute recovery, or was it that the horse picked up again fairly well but was not necessarily quite the same horse afterwards?

Mr. J. D. McLauchlan thought that Mr. Begg had omitted little regarding the geographical distribution of this disease. He had found that in one season one would get a collection of farms giving one case of "grass disease," and that another year it would go to the other end of one's practice. With regard to the symptoms, he did not go so much on the nasal discharge as on the swallowing and the results of rectal examination.

Mr. W. A. Milligan, after expressing his thanks to Mr. Begg for his very excellent paper, observed that his knowledge of the disease was limited to very few cases. The first he saw in his father's practice in the summer of 1928 and since then he had had one or two cases each year. All the cases he had seen were of the subacute type.

The President remarked that he had only had one—a chronic—case. Doubt was expressed as to its being "grass disease" but Professor Buxton, of Cambridge, came down and verified the provisional diagnosis.

The Reply

Mr. Begg, replying to the points raised in the discussion, observed that he had not expected to hear so much said about his paper, because he felt it was a disease comparatively little known in those parts. He was particularly interested to hear of Colonel Holness's experience of "grass disease" in Army horses. He had always held the view that the disease was contracted by inhalation and after hearing what Colonel Holness had said he felt more confident in that view. The amazing thing about the outbreaks amongst Army horses on the Plain was that there were no cases amongst the native horses and practitioners practising there did not come across cases. At the time manoeuvres were carried out the ground was scarce of grass and when one saw horses on the march there was usually a good deal of dust. He wondered if this had any connection with the incidence of the disease. With regard to mild winters favouring "grass disease," personally he did not think that was so, else it would never occur in Scotland but much further south, as the winters in Scotland were seldom mild. Colonel Holness asked him whether he thought it was possible for pasture to become sick and sour and in that way be responsible for the disease. He did not think that could be the case, because they found farms with "grass disease" where there had been rotational cropping for very many years. With regard to treatment by isolation, normally any animal was isolated, but he practised it, not because he thought the animal was a source of infection to others, but because it was much more likely to get the better treatment it deserved if kept by itself.

Concerning the occurrence of "grass disease" when only a few blades of grass were available, he was thinking of the cases he had seen in Scotland about the second or third week in April. At that time more ploughing was done than at any other, because all the turnip land or black ground was ploughed then and the only contact a horse had with any grass was on its way from the stable to the field or when turning at the end of the furrow. He doubted if grass had very much to do with the disease and he certainly thought the soil had more. The constant inflammation of the head membranes even in the early stages supported his view of infection by air.

As regards the line on the abdomen, that usually formed on the line of the ribs. They saw the line, with a little bulge below at first, but after a short time the belly became quite flat and on *post-mortem* when the abdomen was opened one wondered where the muscle had gone. The "tacky" discharge—the subject of another question—was very apparent when examining a case by the rectum. The material clinging to the arm had a peculiar sickly smell; one got the same smell from the mouth. Perhaps the reason was the bowel stasis. Regarding the pulse, it was simply a loud thumping pulse that was very fast and it was always regular, in his experience. Reference had been made to lay opinion. Those of them who were in practice respected lay opinion, especially those of them whose work was concerned with farmers. He himself was always ready to discuss things with a layman. It was true that they were without technical knowledge, but their powers of observation were often the more acute because of that. The period of incubation was another matter to which reference had been made and he was particularly interested to hear about the horses that returned to Aldershot and which developed the disease after seven days. It had not been the accepted view that the period of incubation was so extended. Mr. Begg congratulated Major Sparling on his powers of observation and his ability to describe the symptoms as he saw them. It was quite true that all the customary symptoms were not always exhibited. "Grass disease" was peculiar in this respect. Sometimes all the "text-book" symptoms were present and at other times

a single typical symptom might be the only evidence of the disease. The symptoms might also vary in intensity from county to county and from district to district.

Major Bamford had asked if snoring was a symptom. It was, and the snoring was produced through the throwing back of nasal discharge and food through paralysis of the glottis.

In reply to Mr. White, Mr. Begg said he did not think "rushed up" grass had much to do with the disease, because cases occurred on pastures where there was practically no vegetation at all and others again on the very best pastures. He did not think it had any effect beyond the fact that most of the cases appeared when grass was at the height of its growth.

With regard to chronic cases showing absolute recovery, he meant absolute in the sense that the horse ceased to show any symptoms, but most horses after recovery had never been the same again. He recalled a mare which after recovery from the disease would have pulled the place down if she were left alone in the stable. To him, the symptoms resembled neurasthenia and this would be consistent with the disease being a nervous one. Mr. McLauchlan had raised the point of the disease changing farms every year. They often found it would jump three or four miles and even much farther. It was seldom that the same farm got it year after year and they usually found that it attacked new farms every year. They did not talk of farms being "grass disease" farms in the same way as they talked of tetanus farms.

He feared that, at present, the only certain method of protection from loss was insurance, and to insure against loss meant very high premiums.

To conclude, he wished to say again how delighted he was that so many people had joined in the discussion.

[In the course of an informal discussion which followed, Mr. Begg mentioned that the average temperature in cases of "grass disease" approximated 102·6°.]

R.A.V.C. GOLFING SOCIETY, 1936 MEETING

The annual meeting of the Society will be held, by the kind permission of the North Hants. Golf Club, at Fleet, on June 3rd and 4th, 1936.

Programme of Events

1st Day.—Two rounds Medal Play, Scratch, for the R.A.V.C. Challenge Cup. The Founders' Cup, Medal Play, Handicap, will be decided on the first 18 holes. An Eclectic Competition will be held on the two medal rounds, the winner to have the custody of "The Conder Challenge Cup" for one year.

2nd Day.—Morning. Eighteen holes Singles, under Handicap, *v.* Bogey (Captain's Prize). *Afternoon.* Eighteen holes Foursomes, under Handicap, *v.* Bogey for a prize value 2 guineas.

Optional sweepstakes will be held on all handicap events.

Competitors should be ready to start at 10 a.m. Order of starting will be voluntary.

Members are requested to notify the Hon. Secretary, Major P. S. Sparling, R.A.V.C., Station Veterinary Hospital, Tidworth, Hants. (Tel.: Bulford 11, Mil. 314):—(*a*) Whether it is their intention to be present at the meeting. (*b*) Whether they want caddies.

Accommodation:—Station Hotel, Fleet. Golf Club House (very limited).

A CASE OF SUPPURATIVE EPIDIDYMITIS IN A DOG CAUSED BY *BRUCELLA ABORTUS*

By

T. L. WHITBY
Taunton

T. J. BOSWORTH and J. R. M. INNES
Cambridge

The subject was an Aberdeen terrier, twelve years old, in very fat condition.

History.—The animal, which had been blind for several years, had for some time suffered from polyuria and had shown a variable amount of swelling of one testis. It was killed on April 4th, 1935, when a *post-mortem* examination by one of us (T. L. W.) revealed an excess of fluid in the cavum vaginale on one side and the presence of pus in the epididymis; from the latter, infection had spread along the inguinal canal, at the entrance to which a small quantity of purulent material was observed. The testis, epididymis, kidneys, bladder and prostate were forwarded to the laboratory for examination.

Macroscopic Appearances. *Testis.*—No gross swelling of the organ; the tunica albuginea was smooth and the testicular substance showed a slight degree of *post-mortem* softening. *Epididymis.*—Apart from slight swelling no abnormalities were visible from the surface; on cutting into the structure numerous small pockets of yellow pus were seen in the head, body and tail; the spermatic cord was not included in the specimen sent. *Kidneys.*—The capsule had been stripped; the surface was smooth and free from gross granulation but a few small scattered scars were visible on it; the cortical pattern was distinct and the medulla and pelvis showed no changes. *Bladder.*—No abnormalities; the ureteral openings patent. *Prostate.*—No hypertrophy or cyst formation; one small soft yellow focus present in its substance.

Histological Findings. *Epididymis.*—The normal tubular character was completely obliterated except in a few areas where dilated tubules, showing partially disintegrated epithelium and containing cellular débris, were still recognisable. Throughout the gland there were numerous necrotic foci which in places had become confluent to form larger areas. At the margins of these foci and in the tissue between them there was an acute exudative inflammatory reaction; the vessels persisting in these situations showed hyaline necrosis of their walls, and haemorrhage had occurred into the tissue around. The interstitial tissue appeared oedematous with scattered fibrinous deposits. There was an intense cellular infiltration of polymorphs, lymphocytes, plasma cells and large phagocytes but without the predominance of any one type. In other areas cellular infiltration was not so marked. The tunica albuginea was also involved in the inflammatory reaction. It appeared thinner than normal while the collagenous and muscle fibres were separated by haemorrhage and cellular infiltration. In one area the necrotic process had extended to the surface. *Testis.*—There were no lesions present comparable to

those seen in the epididymis; the structure appeared to be similar to that normally found in the senile state; spermatogenesis was not evident. Around the vessels situated beneath the tunica albuginea were small collections of lymphocytes but the tunic itself appeared normal except near the epididymis where it showed inflammatory changes similar to those seen in that organ. *Kidneys.*—No changes corresponding in any way to those observed in the epididymis were present. There was no diffuse nephritis, but the scars which were evident macroscopically on the surface were found to correspond to small isolated foci in which the glomeruli showed ischaemic changes (atrophy of the tuft and thickening of the capsule) and in which there was atrophy of the related tubules, periglomerular fibrosis, and lymphocytic infiltration of the fibrotic tissue. These foci were thus typical of chronic focal glomerulo-nephritis of a kind which is often seen in old dogs, and evidently bore no relation to the infection in the epididymis. *Bladder.*—Apart from *post-mortem* degeneration and desquamation of the epithelium no lesions were observed. *Prostate.*—As in many such glands examined some time after death, *post-mortem* degeneration of the acinar epithelium was very marked; in the small focus observed macroscopically there was early new formation of small acini with cubical epithelium, diffuse interacinar fibrosis and marked infiltration of the latter by lymphocytes, plasma cells, and large macrophages.

Summary of Pathological Findings.—Acute suppurative epididymitis; focal periorchitis; chronic focal prostatitis with commencing adenoma; chronic focal glomerulo-nephritis.

Changes similar to those observed in the prostate and kidney are frequently seen in aged dogs and their presence in this case appears to bear no relation to the infection in the epididymis. The lesions in the latter are comparable to those which have been described in *Br. abortus* infection of the bull's testis and are of a non-specific character, predominantly exudative in type with a tendency to necrosis.

Bacteriology. A growth of *Br. abortus* was obtained from the lesion in the epididymis but the other organs proved to be sterile apart from the presence of a few extraneous organisms. The culture was identified as Brucella by means of a known agglutinating serum. When first isolated it grew only in an atmosphere containing an increased amount of CO_2 and was slow in becoming acclimatised to ordinary aerobic conditions. Growth occurred in the presence of methyl violet 1: 50,000, basic fuchsin 1: 25,000, and pyronin 1: 100,000, but was completely inhibited by thionin 1: 60,000. The production of H_2S from culture media occurred only during the first 48 hours of incubation under aerobic conditions. These results indicated that the organism was of the bovine type of *Br. abortus* and this was confirmed by comparing its serological characters with those of a freshly isolated bovine strain. Agglutinating sera for each were prepared in rabbits and were then absorbed fractionally by adding successive small doses of organisms. It was found that either strain was capable of removing agglutinins, for itself and its opposite number, from both these sera to the same degree at the various stages of the process and this, according to the findings of Wilson and Miles (1932) would indicate that they were of the same type.

Comment

There is evidence to show that the canine species possess a relatively high degree of natural resistance to organisms of the Brucella group other than *bronchisepticus* and that although cases of infection with *melitensis* and *abortus* may occasionally occur they usually pass unnoticed in the absence of clinical symptoms. There are on record a few instances in which aborting bitches have been found to react to the agglutination test, while Planz and Huddleson (1931) described a case of illness in a dog associated with a unilateral purulent orchitis from which *Br. abortus* var *suis* was isolated. Apparently, however, this is the only recorded example of a specific lesion in a canine animal caused by an organism of this kind and nearly all other reported cases of natural infection have been diagnosed solely on the presence of specific antibodies in the blood. In most instances these have been found in low concentration only. The reacting animals have shown no signs of ill health and it has not been possible to isolate the organism from their tissues on *post-mortem* examination. Exceptions to the latter rule are the recovery of *melitensis* from a mesenteric gland of one case by Kennedy and Eyre (1914) and of the bovine type of *abortus* from the blood of another by Van der Hoeden (1932). The evidence suggests that dogs in close contact with cattle are more liable than others to contract infection (Thomsen, 1932). For fuller information on the various aspects of the subject reference may be made to the articles by Van der Hoeden (1932), Menzani (1932), and Feldman, Mann and Olson (1935).

Several workers have shown that it is possible to infect dogs experimentally with artificial cultures, the most certain method being by intravenous injection. Animals so treated develop agglutinins and the organism may be recovered from them for varying periods after inoculation. In most cases, however, the infection is rapidly overcome. Feldman, Bollman and Olson (1935) found that little or no disturbance of health resulted and that no lesions worthy of note were produced. Pregnant bitches carried their litters to full term and there was no evidence of spread from affected to healthy dogs. Van der Hoeden, however, believes that such spread may occur and that infected dogs are a source of danger to man and other animals. Cardona (1935) has reported that the experimental disease in the dog may be associated with a temperature reaction resembling undulant fever in man together with marked loss in weight and the persistence of a high agglutinating titre for periods up to 15 months. He also noted the occurrence of intermittent lameness in afebrile cases.

(*Contd. at foot of col.* 1, *p.* 664.)

VETERINARY MEDICINE IN SPAIN*

E. LECLAINCHE

On numerous occasions we have acquainted our readers with professional happenings in Spain during the last 30 years.

Nothing is more curious and interesting than the history of veterinary medicine in Spain. After the brilliant period of the Moorish occupation, the Catholic monarchs granted effective protection to the "albeitares" (veterinary surgeons), whose interests were guarded by a professional jury, the tribunal known as the Protoalbeitarato. The foundation of the Madrid Veterinary School in 1793 seemed as if it was going to substitute regularly-instructed veterinarians for practitioners who had learned their work merely by an apprenticeship, when a disastrous measure intervened. The Cortes, meeting in Cadiz in 1813, decreed that there was to be complete liberty in every industry and office and that the liberal professions might be practised without any diploma. The consequences were deplorable. The profession, encumbered by practitioners of all sorts of origin, and innumerable quacks, declined painfully in spite of the merits of a few. Among the latter was Don Juan Morcillo Ollala, Meat Inspector at Jativa, who published, in 1859, a "Meat and Fish Inspector's Guide." This represents the first work on inspection and preceded by more than 15 years the publications of Gerlach (1875) and Baillet of Bordeaux (1876).

It was not until the end of the last century that a revival took form. The National Congress at Madrid in 1883 marks the dawning of a new era. A National Veterinary Assembly met in Valencia in 1904 under the presidency of Morcillo, and a second meeting was held at Madrid in 1907, at which the President was Dalmacio Garcia e Izcara, Professor at the Madrid and Leon Schools and later Director of the veterinary section at the Alfonso XIII Institute of Hygiene. This Congress was followed by the creation of the Animal Hygiene Service brought about by Vicomte Eza, Director of Agriculture.

As early as 1911 Garcia had founded, with Gordon Ordás, the *Revista de higiene y sanidad pecuaria*, the organ of the reformers. The Sanitary Law was passed in 1914, while the 1915 statutes completed the organisation of the Sanitary Service.

In 1923, a professional association, of a syndicalist nature, united more than 3,000 practitioners. Of a liberal, if not revolutionary, tendency, the association opposed the dictatorship of Primo de Rivera, while its leaders compiled a complete programme of reforms to be brought about with the expected fall of the monarchy. The latter came about with the 1931 revolution. Dalmacio Garcia had disappeared; but Gordon Ordás took part in the new Government in the capacity of Under-Secretary of State to the Ministry of Public Works and National Finance. He established the General Board of Animal-breeding (Ganaderia), the organisation and aims of which are given here.

The new Government had to grope its way amid numerous difficulties, and politics intervened. Gordon Ordás was obliged to leave the Board of Animal-breeding, which was then entrusted to a country pharmacist ill-prepared for such a task.

At the present time, retrenchments are anticipated in every service. The General Board of Animal-breeding is sure to be suppressed, but the services will probably preserve their independence under the General Board of Agriculture. It is to be feared, however, that the stud-farms will be restored to the Ministry of War, along with the remounts.

Reform in teaching had already been achieved under the monarchy. Since 1900 a school-leaving certificate had been required for entry into the colleges. The royal decree of September 27th, 1912, which was due to the Minister Santiago Alba, provided a statute for teaching, covering a five years' course and distributed over ten (professorial) chairs. The Republican Government decree of September 7th, 1931, created the degrees of "Licentiate" and "Doctor" of Veterinary Medicine and Zootechny.

The project concerning university reform submitted to the Cortes on March 16th, 1933, by the Minister of Public Education provided for the transforming of the colleges into Veterinary and Zootechnical Faculties; it reduced to three years the course of study for the title "Licentiate of Veterinary Medicine and Zootechny" necessary for professional practice,

*Translated from *Revue Générale de Médecine Vétérinaire* (1935.) **44**. 526. 630-634.

References

Cardona, L. (1935.) *Boll. Sez. ital. Soc. int. Microbiol.* **7**. 131. (Abstr. *Vet. Bull.* (1936.) **6**. 13.)

Feldman, W. H., Mann, F. C., and Olson, C. (1935.) *J. inf. Dis.* **56**. 55.

Feldman, W. H., Bollman, J. L., and Olson, C. (1935.) *Ibid.* **56**. 321.

Kennedy and Eyre. (1914.) quoted from Feldman, Mann and Olson (*vide supra.*)

Menzani, R. (1932.) *La nuova Vet.* Oct. 15th. 385. (Abstr. *Bull Off. int. Epizoot.* **6**. 716.)

Planz, J. F., and Huddleson, I. F. (1931.) *J. Amer. vet. med. Ass.* **79**. 251.

Thomsen, A., quoted from Zeller (1933.) *Bull. Off. int. Epizoot.* **7**. 73.

Van der Hoeden, J. (1932.) *Tijds. v. Diergenees.* **59**. 1396, 1446. (Abstr. *Bull Off. int. Epizoot.* **6**. 896.)

Wilson, G. S., and Miles, A. A. (1932.) *Brit. J. exp. Path.* **13**. 1.

The degree of "Doctor of Veterinary Medicine and Zootechny" was to be obtainable by Licentiates after a new course of study and according to conditions to be fixed by decree.

These projects were excellent; unfortunately their realisation is far from complete.

Spain possesses four veterinary schools: at Madrid, Cordova, Saragossa and Leon.

The Cordova College has been in course of reconstruction during the last ten years. A magnificent building, conceived in the best Cordovan style, is almost complete, and although criticism may be expressed in regard to its prospective management, it will give very spacious accommodation to the different services.

The other schools are miserably furnished. The Madrid College, situated in an outlying part of the town, has only very old and obsolete equipment; the Saragossa College is squalid, and in the small, dilapidated house of which it consists, 300 students have to receive their instruction.

It must be added that everywhere the teaching staffs are incomplete and that professors are substituted by deputies, all branches of tuition lacking qualified men.

The painful impression left by a visit to the colleges makes one the more sympathetic towards the teachers who, under these difficult conditions, fulfil their double mission of research and teaching with courage and self-sacrifice worthy of admiration.

All have confidence in the future, and they do their utmost to prepare for it.

The Madrid College has just made its existence felt by publishing the first volume of its "Annals." Its distinguished Director, Don Rafael Gonzalez, recalls in the preface of the book the still recent memory of the two teachers who brought honour to the college, Dalmacio Garcia and Abelardo Gallego. Their published works bear witness to the scientific worth and activity of the masters of Madrid. One cannot but regret the more, on reading these pages, that modern equipment and apparatus are not at their disposal.

It is in the actual personnel of the Board of Animal-breeding that one would particularly like to see the necessary improvement. The General Board, as constituted, comprises to this day veterinary teaching, management of animal-breeding and hygiene, and sanitary supervision of animals. Even reduced to a single Board the organisation will be perfectly uniform on the express condition that it remains under the authority of a veterinarian. One would not wish to split up this combination at the risk of jeopardising the whole structure.

But, on the other hand, one can understand the impatience of some people. The Spanish Republic is developing higher education on a large scale. At Madrid all the Faculties and higher-educational colleges—the Agricultural Institute, etc.—are going to be amalgamated into a large City University, the construction of which is nearly complete, and which will be inaugurated next year (1936). Should the veterinary schools ally themselves with this group and put themselves on the same footing as the other higher-educational establishments?

One might well hesitate over the choice of a solution of this; but it is certain that the veterinary schools of Spain cannot, without danger, remain in the state of neglect in which they have been left.

The creation of the Institute of Animal Biology, which our colleague C. Ruiz Martinez directs with much energy and skill, shows what can be achieved in the way of scientific organisation. Perfect equipment, absolutely modern, allows of very interesting research, and the annual publication of work carried out reflects the highest honour on the workers who are attached to it.

The task was so formidable that one would not have been surprised if it had not been achieved. It was necessary to wrest from the monarchy the more essential reforms in the organisation of the services. The régime of the dictatorship called for continual struggles to retain the position gained. Finally, during the last few years, political fluctuations have hindered the work of intended reform—perhaps conceived on too large a scale.

Those who have followed the evolution of the profession during these last years will have realised the ground that has been covered. To-day, Spain possesses a professional personnel which many countries might envy. United by the struggles seen through together, and animated by the same ideal, the heads of services, the teachers and the directors of the National Association, pursue with a single faith and enthusiasm the achievement of the work, the programme of which was initiated by Dalmacio Izcara and Gordon Ordás.

J. W. M.

SCIENTIFIC RESEARCH IN AUSTRALIA AND NEW ZEALAND

We read in *Nature* (May 9th) that at the instance of the Governments of Australia and New Zealand, steps are being taken to effect close collaboration between their respective Councils for Scientific and Industrial Research. The two Dominions have in common many problems in primary industry, and united action to solve them is obviously desirable. It is proposed to attach New Zealand officers to the Australian teams working on (*a*) mammitis in dairy cattle, (*b*) bovine contagious abortion, (*c*) sterility in sheep and (*d*) preservation and transport of foodstuffs. Australia will probably second an officer to the staff of the Dairy Research Institute of New Zealand. This move for closer association between the research councils of the Dominions is overdue and its development will be watched with much interest.

C

I.—Lieut.-Colonel F. D. Hunt: A Further Appreciation

and

Economic Value of the Veterinary Service to the State in connection with Remount Service

Major-General SIR JOHN MOORE, K.C.M.G., C.B., F.R.C.V.S.

In the passing of Lieut.-Colonel F. D. Hunt, O.B.E., recorded in your issues of April 25th and May 2nd, the Royal Army Veterinary Corps has lost a very popular and experienced officer. My personal regard for him was expressed in the following Confidential Report, No. 8295/1/Q.M.G.11, dated Simla, June 2nd, 1920. "Though a very capable veterinary officer his value to the State is essentially in the capacity of a Remount Officer and as such he has over and over again been utilised during the past 20 years. His ability in this is fully endorsed by the Director of Remounts, Army Remount Department [at that time Brigadier-General C. F. Templar, C.M.G., C.I.E.]. I am strongly of opinion that it would be to the best interests of the State to transfer Lieut.-Colonel Hunt from the R.A.V.C. to the Army Remount Department as a Remount Officer. This would enable the State to reap the full benefit of his abilities. His services simply as a veterinary officer are wasted. Moreover, by his faithful service to the Remount Department he has to forego his chances of attaining administrative appointments in his own Corps."

I am sending you, for reproduction in this issue, a very interesting and valuable report on the Ahmednagar Remount Depôt and Stud Farm by Lieut.-Colonel F. D. Hunt, who in 1912 was officiating superintendent, and which will be of interest to readers of the *Veterinary Record* and the veterinary profession in general.

To turn to the second subject of this article, there can be no doubt that veterinary service carries economic value to the State in connection with remount service. I have repeatedly stressed the fact that horses are cheaper than mechanisation, and I am decidedly of opinion that our Army authorities are carrying mechanisation of cavalry units too far. In any subsequent war, there will be a constant need for cavalry and animal transport. Remount service will therefore be much in evidence, and veterinary service much in need to cater for the disabilities of all animals. The expense to the State in the provision of mechanical transport will be enormous and repair of mechanical vehicles will far outweigh the cost of making animals again serviceable. This was very conclusively proved during the World War by our own Expeditionary Force in France, and by the American Expeditionary Force. In India, too, there will always be need for animal transport. Whichever is cheapest is certainly the best, both in peace and in war.

This article has been written at short notice but the writer will only be to glad to answer to the best of his ability any questions relative to the above or to Lieut.-Colonel Hunt's report, asked by interested readers through the Editor.

II.—The Ahmednagar Stallion Breeding Stud

This stud was founded in 1904 after the Royal Commission of 1900, the object being to make Government more or less self supporting in stallion power, and to keep up the indigenous breeds which have of late years become nearly extinct, and also to reduce the expenditure on imported stallions—particularly Arabs, which for some years past have been brought into the country in much reduced number of inferior quality and for which much larger prices are asked than formerly. It must be distinctly understood that this stud was *never* formed with a view to *supplying actual remounts.*

When the stud was first started the number of mares was limited to 85, and made up as follows: Ten T.B. Australians, 13 Arabs, 15 Deccanis, 15 Kathiawaris and 15 Marwaris—total 85—with a stallion to correspond to each breed. After six years, owing to the want of type, the difficulty of getting the mares in foal, and often the delicacy of the foals themselves, it was decided to abandon the idea of breeding Australian thoroughbreds in India, as they could be imported better, and cheaper, when required, the number of this class being small. At the same time, as the Arab mares were doing well it was decided to increase their number correspondingly.

The following year, the Deccani breed, which was really a cross-breed of Arabs and English thoroughbreds on the indigenous mares of the Deccan, was discontinued—not that the productions were indifferent, but they could hardly be said to have had sufficient time to be called a distinct type. And, again, the Arabs were increased by 15. This was a very sound move, because having the type required, it was unnecessary to spend time in forming another class or type of horse.

The stud as it now stands, consists of 55 Arabs, 15 Kathiawaris, and 15 Marwaris—total 85—which are kept pure. Although the stud has now been a going concern for only eight years, it is quite easy to recognise that it has established itself and is now producing exceptionally fine stock, chiefly due to the fact that all unsatisfactory mares have been eliminated, and in a few years there will be no mares in the Stud which do not belong to anything but the families of each breed, bred in the stud itself. When this object is attained, there should be no difficulty in turning out a very large percentage of Imperial stallions. Of course, it must be recognised that, taking one year with another, fillies and colts divide honours as to their proportionate numbers.

From reports to hand of the Arab stallions issued up-country as Imperial stallions, they are incomparably superior to what can be obtained in the Bombay market, particularly as to the size of bone.

It may be interesting to those who do not know these Eastern breeds to learn that the Kathiawari and Marwari classes are old breeds of Indian horse, dating back hundreds of years before the thoroughbreds of England, and are as distinct types as the Arab himself. The Kathiawari is a small horse, standing from 14-1 to 15-0, full of quality, with short back and a beautifully turned head and neck. The Marwari is a larger, more powerful horse; he has the same stamina as the Kathiawari, but is not what might be called as "pretty" a horse. These two breeds are of all colours. It is a mistake to think that all pure Kathiawaris and Marwaris are duns with lists down their back, donkey crosses and Zebra marks. In this stud, we have them of all colours with the exception of black.

Statistics are never very interesting reading, but a few figures may not be out of place in this article:—

Foalings for three years.

1909-10	... ...	83·87 per cent.
1910-11	... ...	75·00 per cent.
1911-12	... ...	83·11 per cent.

It will be seen from this that these breeds are very prolific.

The mortality is also given below for the same period, which will also show that they are a very healthy and sound class.

1909-10 ...	11	Out of a total strength
1910-11 ...	4	of from 190 to 220 head
1911-12 ...	8	of young stock.

These results may largely be attributed to the excellent climate of Ahmednagar and also to the fact that the stock are never pampered or over-fed, and lead as natural a life as it is possible to give them.

Breeding operations are carried on the whole year round. There is no particular foaling season as in England; at the same time, the greater number are foaled in the early spring of the year.

The area of the stud farm amounts to nearly 800 acres (now 1,200 acres), divided into paddocks of from five to 30 acres. The mares are kept in small numbers in comparatively small paddocks, and drafted according to their particular stages of pregnancy. The foaling boxes are single, large and airy and opening into separate wire fenced enclosures less than a quarter acre each. The mares rarely want any assistance when foaling. The navel cord is never cut or ligatured—but the navel is dressed as soon after birth as possible with a strong astringent and antiseptic dressing, and the mare and her foal are at liberty to move about their paddock at once. This means that the foal becomes practically acquainted with a wire fenced enclosure from the day of his birth, and as the whole of the paddocks are fenced by wire, we never have the troubles that are considered to attend wire fencing at home. The mare and her foal remain in this box and enclosure until she is again covered (the tenth day) when both mare and foal are drafted to a large paddock; she has then to pass her testing trials before being moved on to a still larger paddock. The foals are weaned at six months old and separated in batches of colts and fillies, and these batches remain together for practically their stud life up to three-and-a-half or four years old and are kept in paddocks in mobs of from 25 to 30. Each foal at six months old receives a general number which is branded on the near fore foot, and a stud number with the last two numbers of the year of foaling branded underneath, on the near shoulder, with "A" on the off shoulder; he also receives a ticket which contains all particulars about him and his veterinary history sheet on the other side. The stud books are most carefully kept, so that anything bred in the stud can be traced with little trouble.

As all stock are handfed, grazing in this part of the country being unknown, they are tied up three times a day for feeding at small troughs in the paddocks. This has manifold advantages:

Firstly.—It means that they are well handled.

Secondly.—It ensures that every animal gets the same amount of food.

Thirdly.—It prevents all bullying and minimises casualties due to kicks.

It would be interesting to some horse breeders in England to see a paddock with 30 young stallions, all from two to three years old, playing about together and to move into the next paddock and find the same class from three to three-and-a-half years old, all as quiet as sheep. This does not mean that there is not a lot of horse-play and galloping, as these colts when not feeding are roaming aimlessly about the paddocks. When at play they look rough, but accidents are practically nil.

It would also interest the home breeder to see these colts and fillies galloping over ground which is as hard as the ordinary macadamised road, nothing having ever been done to the feet with the exception of being trimmed once every six weeks. This is done by a native farrier when the stock are feeding at their troughs, and he can do this operation on all four feet, seldom having to require the assistance of a single man.

At three-and-a-half to four years old, the stock are taken up. Fillies that are required for replacements in the stud are broken to saddle, harness and plough. Colts are ridden, misfits are castrated, and transferred to the Remount Depôt to which the stud farm is attached.

Undersized stock are broken and prepared for sale by public auction at Poona and Bombay—and it is satisfactory to notice that the numbers of the latter are, year by year, decreasing. It is also satisfactory to observe that this stock is appreciated by the public who, at the last sale, gave an average of £27 per head for what in England would only be called "small ponies" and mostly under four years old.

All stock at four years old to the day are struck off the stud strength; that is to say, the stud does not bear their expenses further. The colts selected as Imperial stallions are railed up to the large horse breeding centres in the Punjab and elsewhere, where they are further worked and limited to a few mares, and they are in full work at six years old. Fillies, geldings, and misfits are treated as mentioned before.

The strength of the stud at the time of writing is:—

Mares	85		
Stallions ...	6		
3 year old colts	41	3 year old fillies	17
2 year old colts	22	2 year old fillies	22
Yearlings ...	27	Yearlings ...	30
Weanlings ...	21	Weanlings ...	14
Foals at foot ...	12	Foals at foot ...	7
Total	214	Total	90

Economy is one of the marked features of this stud; without going into minute details, it may be mentioned that the stud is worked by one superintendent, one veterinary officer, and two (now one) European subordinates, the rest of the establishment being Indian. It must not be concluded that the stud finishes these officers' duties, as in addition to the stud there is a Remount Depôt which in normal years contains 500 Australians and a hundred Arabs. [This number was multipled by ten during the War.—J. M.] These horses are purchased by the superintendent and veterinary officer in the Bombay market, railed to Ahmednagar and broken and acclimatised and then issued to various branches of the service that require them.

F. D. Hunt, Lieut.-Colonel, R.A.V.C.,
Veterinary Officer and
Officiating Superintendent.

Remount Depôt and Stud Farm,
Ahmednagar,
(Deccan), India.
1912.

Cardiff Corporation Health Committee has asked the Medical Officer of Health to report upon the practicability or otherwise of a system being instituted at the public abattoirs to mark meat so that, when subsequently it had come into the possession of meat retailers, there would be means of showing that it had been inspected and passed by the meat inspection staff of the Corporation.

Clinical Communication

GASTROSCOPY

W. A. S. STEVENS, M.R.C.V.S.
Southsea

The gastroscope is an instrument extensively used by the medical profession for inspecting the pharynx, oesophagus and stomach. It is also employed to remove foreign bodies and obtain portions of neoplasms, etc., from these organs for microscopical examination. A similar instrument, the bronchoscope, is used for like purposes in the upper respiratory tract.

The gastroscope consists essentially of a metal tube illuminated at the distal end by a very small electric bulb and with a handle at the proximal end. The length and diameter of the tube employed vary according to the subject.

A general anaesthetic having been administered, the patient is placed on its back and the instrument passed into the oesophagus *via* the pharynx. This is quite a simple operation—especially in the case of the dog, owing to the very dilatable oesophagus. By looking down the instrument and adjusting it to the required position it is possible to carry out a detailed examination. The view may be obscured by mucus or blood, where there is laceration by a foreign body. This is overcome by frequently passing a swab of gauze or wool down the tube on specially designed forceps which are also used for gripping and removing foreign bodies. If sufficiently small the foreign body may be drawn up inside the tube. Numerous very ingenious instruments are used for dealing with foreign bodies and obtaining samples of growths. One in particular must be mentioned, and this is a contrivance which grips safety-pins and closes them before removal.

When inspection of the stomach is to be made a period of fasting must be ordered prior to the operation.

. . . . .

Case 1

Subject.—Five-year-old neuter tabby cat.

History.—Two days previous to examination, the patient had refused all food and continually choked and salivated.

Examination.—Examination, visual and by palpation, revealed nothing further. No obstruction was felt on passing the probang under chloroform anaesthesia: X-ray examination revealed a shadow which was believed to be a splinter of bone. The next day the patient took a little milk and white of egg and in the evening the gastroscope was passed under general anaesthesia, but in spite of a very careful examination, no foreign body or abnormality of any nature was found.

Tentative Diagnosis.—A splinter of bone had

passed through the wall of the oesophagus into the surrounding tissues.

Treatment.—Consent to make an exploratory incision could not be obtained. However, the patient appeared to be better, the symptoms were less severe and he was taking a little liquid nourishment.

Treatment consisted of allowing white of egg and milk *ad libitum*, and liberally dabbing the front paws with honey. The cat gradually improved and two weeks later appeared normal. A further X-ray examination revealed nothing.

As there is no evidence of abscess formation it is presumed that the foreign body must have become dislodged between the first X-ray and the passing of the gastroscope, or during this latter operation, and was overlooked in the stomach.

Case 2

Subject.—Two-and-a-half-year-old West Highland dog.

The owner, who is a breeder of these dogs and intelligent, had been abroad; on returning she was informed that for the last five days the dog had refused all food, would only drink a very little, and this was thought to be due to a dispute he had had with a goat. He had also vomited blood on one occasion. The owner immediately observed a large swelling in the neck.

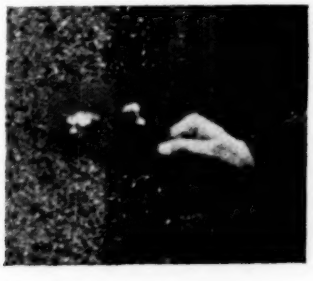
Examination.—The swelling proved to be about the size of a pullet's egg, hard, and situated on the ventral aspect about half-way between the pharynx and the anterior end of the sternum. The patient was subdued but did not show any signs of pain except on manipulation.

Diagnosis.—A foreign body in the oesophagus —probably a bone.

Prognosis.—Grave, owing to the size and length of time the obstruction had been present.

Treatment.—The gastroscope was passed under chloroform anaesthesia and revealed a large mass of bone, together with considerable haemorrhage.

Owing to the size of the bone and constant obstruction of the view by blood, which had to be frequently swabbed away, considerable difficulty was experienced. As will be seen from the photograph, there were two pieces of bone, the smaller being situated proximally. The second and larger portion was very firmly wedged and considerable traction was necessary to shift it; this was eventually accomplished in half-an-hour. The bone was covered in blood and mucus and smelt very foetid.



Subsequent palpation revealed an indefinite oedematous swelling which eventually subsided. The patient was very exhausted for the first 24 hours, but during the next 24 he gradually recovered his spirits and drank one pint of milk and the whites of four eggs. On the third day he appeared practically normal and drank as much as he was offered. He was kept on fluids for ten days and sloppy food for another week, and made an uneventful recovery.

Observations.—Owing to the prevalence of foreign bodies in the oesophagus and stomach of dogs and cats, gastroscopy seems to have great possibilities in our profession. It is very much simpler and safer than an operation with the knife. The great disadvantage is, of course, the original outlay in purchasing the necessary apparatus.

I have always found the medical profession not only willing, but eager, to give assistance, and no doubt other practitioners situated in large towns or cities will, like myself, be able to enlist the aid of their local ear, nose and throat specialist.

I wish to acknowledge my thanks to Dr. C. A. Scott Ridout and his assistant.

VITAMINS AND IMMUNITY

"A battle over the anti-infective action of the vitamins is waged to and fro; but it is a pity there should be any battle. Professor Rominger, of Kiel University, sums up the situation in the following words: 'Die Rolle, die Vitamine bei der Infektabwehr spielen, ist noch keineswegs klar erkannt und wird vielfach überschätzt'; which is in fact a not unjust verdict. A specific action of the vitamins against infection has been sought and not found, except in the case of vitamin A. In rats deficiency of this vitamin leads to damage to epithelial tissues which is indisputably favourable to the penetration of infective organisms. In man it is seldom pushed to an extreme and opportunities for critical observation on any considerable series of cases have been few; but in Bloch's famous series of infant cases, in which the deprivation was severe, the disposition to broncho-pneumonia was conspicuous.

Unfortunately this question of the relation of vitamins to immunity is used in the political argument for and against prophylaxis against widespread malnutrition. It seems to us certain that malnutrition in any form, whether qualitative or quantitative, must aggravate the detrimental effects of infection, and whether it does so in a specific sense or otherwise is of less importance."—*The Lancet*, April 11th, 1936.

* * * * *

The first volume of the Clydesdale Stud Book of Canada was issued in 1885. The pedigrees recorded up to December 31st, 1935, total 85,109 —stallions, 27,509; mares, 57,601. In Volume 34, issued in 1935, 1,018 stallions and 1,796 mares are recorded.

Annotation

[Infectious Anaemia or Swamp Fever in Horses.
Stern, C. D. (1935.) *J. Amer. Vet. Med. Ass.*, **87**, 312.]

Infectious anaemia is a specific infectious disease of the horse characterised by an acute of chronic febrile septicaemia with a progressive diminution in the number of erythrocytes and a varying degree of emaciation. It is produced by a filtrable and ultramicroscopic virus. It has been reported in various parts of Europe, Japan, Russia, South Africa, Morocco and America. During the War it was recorded on the different fronts. It has not been recorded to exist in Great Britain.

This paper by Stern is a review of the Bureau of Animal Industry's investigations on the disease made by J. R. Mohler (1906-1908), C. F. Flocken (1906-1916), C. W. Olson (1927-1929), and C. D. Stern (1929-1934).

The disease was found to be most prevalent in low-lying and badly-drained sections, but occurred also on marshy pastures at altitudes of 7,500 feet. The disease made its appearance with the beginning of warm weather, reached its height in midsummer and again declined in late autumn. It was also more prevalent during wet years and when biting insects were most numerous.

The results of the early investigations confirmed Carré and Vallée's (1904) finding that the disease is due to a filtrable and ultravisible virus. These observations have also been amply confirmed by the Japanese Commission (1914) and others. The virus was found to be present constantly in the blood of affected animals. The injection of infective blood subcutaneously or intravenously into horses reproduced the disease. It will be recalled that the Japanese Commission had suggested the possibility of the transmission of the disease by biting flies such as *Tabanidae*, *Stomoxys* and *Simulium*. This possibility has been studied by Flocken and Howard (unpublished observations). They were able to transmit the disease with the stable fly *Stomoxys calcitrans* in one test, but failed in the second. The same workers in a single experiment with the horse-fly (*Tabanus*) failed to transmit the disease. Scott (1920) also obtained suggestive evidence that *Stomoxys* may transmit the disease.

Seyderhelm (1918) had suggested that the disease was due to the toxic action of *Gastrophilus* larvae. The present investigators concluded from their experiments that these "bots" do not play any part in causing swamp fever. [de Kock (1919) showed that although *Gastrophilus* larvae may carry the virus, their toxin is not the cause of the disease.—I. A. G.] Other workers have shown that the disease can be produced by the feeding of large quantities of blood from affected animals but the Bureau experiments, feeding large quantities of highly infective serum, gave negative results.

A healthy horse kept beside an infected one for seven months did not contract the disease. Another animal kept in contact with experimentally infected animals for a period of six years likewise remained well. It is stated that both of these contact animals were later found to be susceptible to the disease since inoculation with infected blood produced the disease from which they died. [It is not stated whether the blood of the contact animals was found to contain the virus. It may be recalled that Schalk and Roderick (1923) kept a horse, which had been inoculated experimentally with the virus and had not shown signs of anaemia, for 14 years. During this time the animal was bled on 18 different occasions and the virus recovered from its blood infected fresh horses. Ultimately the animal showed acute anaemia.]

In the Bureau experiments only equines were found to be susceptible to swamp fever. Attempts to infect calves, sheep, swine, dogs, rabbits, and guinea-pigs were without success. Reference is made to the observations of workers in other countries that man and swine can be infected with the virus. [For details of these reports those interested are referred to the article on Infectious Anaemia of the Horse by the abstractor in the Medical Research Council System of Bacteriology, vol. 7, pages 357-361.]

In 13 cases of experimentally produced infectious anaemia the Bureau found that the incubation period was from seven to 28 days. The first symptom noted was a rise in body temperature. The duration of the febrile period varied from two to three days to a week. The febrile reactions were found to recur at irregular intervals. Following a number of febrile reactions, the animals began to lose weight and there was diminution of muscular energy, emaciation, pallor of the visible mucous membranes, weakness in the hind quarters and a staggering gait accompanied by oedematous swellings. All experimentally produced cases were of a chronic type. Any debilitating influences contributed to the severity of the disease; thus a chronic case having been sent out to pasture soon terminated fatally, and a moribund field case brought to the experimental station assumed a chronic course under enforced rest and good feeding. In advanced cases albumin was found in the urine and a marked diminution of red and white corpuscles in the blood. The anatomical changes observed in all cases were similar to those described by other workers, *viz.*, general emaciation, ecchymotic haemorrhages on the serous surfaces of the intestines and mesentery, somewhat enlarged spleen which was also soft and friable; the kidneys also were enlarged, pale, soft, and

friable. The heart in most cases was enlarged and had haemorrhages on the external surface. Straw-coloured exudate was sometimes found in the thoracic and abdominal cavities.

The Bureau have come to the conclusion that the definite determination of the presence or absence of infectious anaemia can be made only by inoculation of blood into either susceptible horses or mules.

Fulton (1930) had suggested that the mercuric chloride test originated by Bennett and Kenny (1928) as a means of diagnosing trypanosomiasis in camels might be applied to the diagnosis of swamp fever.

The Bureau found that of 96 samples of normal horse and mule sera examined, five gave positive reactions, 17 were partially positive and 74 were negative. Of 25 samples of serum from field cases of swamp fever, 22 gave positive reactions. The results of tests in other infections showed that a high percentage of samples of serum from cases of trypanosomiasis of horses (dourine and murrina), glanders and haemorrhagic septicaemia also gave positive reactions, so that the mercuric chloride test cannot be considered as a specific diagnostic test. It was noted also that samples of serum which produced a strong positive reaction to the mercuric chloride test likewise produced reactions with distilled water, and that samples of infectious anaemia serum stored in the cold lost their power to react to the test.

No specific means of prevention or treatment of the disease has been evolved. An attempt was made to produce a hyperimmune serum by injecting large amounts of virulent blood into apparently immune animals. These horses, however, subsequently developed the disease and died. Rest, abundance of good food, hygienic conditions and elimination of all influences that are debilitating in character constitute the best means of combating the disease so far available.

I. A. G.

THE NATIONAL PONY SOCIETY

At a meeting of the Council of the National Pony Society Mr. Herbert Bright, the polo pony breeder, of The Cove, Silverdale, Carnforth, was formally installed as President of the Society, with Mr. R. B. Charlton as vice-president. Major H. Faudel-Phillips was re-elected steward of the London Show, and Mr. M. H. Taylor was elected a steward. Miss Norah Mackenzie, Mr. William Jackman, and Mr. Gerald W. Williams were elected to fill vacancies on the council.

Expenditure.—The total cost of this department for the year under report amounted to over £130,000; an indication of the comprehensive nature of its activities.

G. K. W.

Report

PUNJAB

REPORT OF THE CIVIL VETERINARY DEPARTMENT FOR THE YEAR 1934-35*

The report, as usual, is very informative and interesting and any member of the profession desirous of obtaining an insight into the work of a provincial veterinary department in India should obtain a copy. There are five pages of photographs. The staff employed in the districts and on the Government Farm consisted of one director of veterinary services, five superintendents, three assistant superintendents, 13 deputy superintendents, and 382 subordinates with veterinary qualifications. In addition twelve officers were employed at the Veterinary College.

Breeding Operations.—The extensive work in connection with cattle breeding (including buffaloes), horse breeding, camel breeding and sheep and goat breeding in the districts and on the farms is discussed, and development is recorded in every direction. Investigational work included many activities and a number of publications have been issued.

Disease.—The year under report was on the whole a healthy one. Beneficial results are reported from the surveys in regard to the problem of control in the districts and the instructions distributed. The value of spleen tissue vaccine against rinderpest was demonstrated successfully on a large scale. A large number of vaccinations against black-quarter and haemorrhagic septicaemia were conducted.

The number of veterinary hospitals increased to 299 and there were 1,100 outlying dispensaries at work, while the public demand for more remained unabated. The number of patients treated and castrations performed continued to increase and the figures are large.

Veterinary College.—The number of applicants for admission rose after a temporary setback owing to lack of prospects of employment. Attention was paid to post-graduate training in the meantime. The attendance at the hospital showed a daily average of 235 patients.

The research activities at the College, more particularly in the pathological section, are becoming increasingly important. The report details a number of fields in which this research is being carried out and increased accommodation is stated to be required. A number of publications and articles were published by members of the staff and the *Punjab Veterinary Journal* continues to flourish.

[*High Commissioner for India, Aldwych, W.C.2. 2s. 3d.]

(*Concluded at foot of previous column.*)

N.V.M.A. Divisional Reports

LANCASHIRE VETERINARY ASSOCIATION*

ANNUAL MEETING AT LIVERPOOL

Discussion on the Report of the Northern Ireland Experiments with the Spahlinger Vaccine

Presidential Address

The Annual General Meeting of the Lancashire Veterinary Association was held at the Department of Veterinary Pathology, Liverpool University, 42 and 44, Bedford Street North, Liverpool, on Tuesday, February 25th, 1936, at 2.30 p.m.

The Chair was occupied by the President, R. C. Locke, Esq., M.R.C.V.S., D.V.S.M. (Vict.), other members present being Messrs. A. L. Mullen, F. Hopkin, C. F. Shawcross, A. J. Wright, J. Holroyd, C. T. Trevers, G. Mayall, H. Raynor Hewetson, H. G. Hewetson, F. A. Ball, G. Tullis, J. Mackintosh, J. H. Wright, G. C. Webster, Warwick Fowle, J. C. Baird, E. J. Burndred, W. Woods, P. A. O'Neill, H. T. Matthews, K. D. Downham, P. Richmond, A. G. Stewart, H. H. Aldred, A. L. Bragg, A. B. Mattinson, P. T. Lindsay, R. F. Bett, A. Ratter, J. H. White, A. H. Leyland, G. O. Davies and the Misses Kathleen Massey and Ray Datnow. Messrs. S. C. Young, R. E. Hughes, R. J. Thomas, P. Stubbs, M. G. Tattersall, E. B. Tatton, B. M. Kerruish, C. S. Adams, P. L. Shanks, R. F. Creasey, A. Sutherland, T. G. Bonallo, R. Isherwood, A. B. Shuttleworth, R. Ray Setterfield, Professor J. F. Craig and the Misses Christine A. Woods and E. Hilda Patchett were present as visitors.

Apologies for unavoidable absence were received from Messrs. A. W. Noel Pillers, J. T. Allen, G. H. Locke, A. B. Kerr, E. A. Comer, H. Burrow, J. H. Wood, R. S. White and C. W. Pembrey.

Before calling upon the Hon. Secretary to present the minutes, the President referred to the serious illness of the Hon. Treasurer, Mr. A. W. Noel Pillers, and informed the meeting that he had sent the best wishes of the Association to Mr. Pillers for his speedy recovery.

The President then referred to the presence of Professor Craig at the meeting, saying that, on behalf of the Association, he welcomed him. He hoped they would have the pleasure of seeing Professor Craig at their meetings frequently, and he thanked him for the use of the room and the splendid arrangements made for the meeting that afternoon.

*Received for publication, April 15th, 1936.

Those members who had not completed the voting papers for election of Council were asked to do so forthwith and to hand them to the Hon. Secretary.

The minutes of the previous Annual General Meeting, having been published in the *Veterinary Record*, were taken as read.

Correspondence.—(1) Letters of resignation, in each case owing to change of address, from Messrs. George McKee, J. T. Taylor, and Miss Tillemont-Thomason. It was proposed by Mr. C. F. Shawcross, seconded by Mr. A. J. Wright, and agreed that the resignations be accepted.

(2) From Mr. J. B. Tutt, M.R.C.V.S., Winchester, enclosing copy of his election address as a candidate for Council of the Royal College of Veterinary Surgeons, and asking for support.

(3) From the Hon. Secretary of the Yorkshire Veterinary Medical Association with reference to the issue of a joint election circular.

ELECTION OF OFFICERS AND COUNCIL FOR 1936

President.—It was proposed by Mr. R. C. Locke, seconded by Mr. F. Hopkin, and carried with acclamation that Mr. C. F. Shawcross, M.R.C.V.S., Altrincham, be elected President for 1936.

Vice-Presidents.—On the proposition of Mr. H. R. Hewetson, seconded by Mr. J. Holroyd, Messrs. R. C. Locke and H. Sumner, Jun., were unanimously elected Vice-Presidents.

Hon. Secretary.—Mr. A. L. Mullen was unanimously re-elected, on the proposition of Mr. R. C. Locke, seconded by Mr. G. O. Davies.

Hon. Treasurer.—It was unanimously resolved that Mr. R. C. Locke be elected, on the proposition of Mr. J. Holroyd, seconded by Mr. C. T. Trevers.

Auditors.—Messrs. A. Dobie and J. H. White were re-elected.

Council.—Of six nominees for election to Council, the following five were elected by vote: Messrs. J. Holroyd, A. J. Wright, F. Hopkin, A. B. Mattinson, and G. Mayall.

Secretary's Report

The Hon. Secretary presented the following report, covering the period of February, 1935, to February, 1936:

There have been six general meetings, including the summer meeting. The following papers, addresses and demonstrations have been presented at these meetings:

1. Annual General Meeting at Manchester, February, 1935: Presidential address and clinical notes by members of the Division.

2. General Meeting, Liverpool, March, 1935: Discussion on the Tuberculosis (Attested Herds) Scheme and the Accredited Milk Scheme by Messrs. J. O. Powley of the Ministry of Agriculture and H. T. Matthews of the Veterinary Department, Liverpool Corporation.

3. General Meeting, Manchester, May, 1935. "Professional Conduct," by Dr. F. Bullock, Registrar of the Royal College of Veterinary Surgeons.

4. Summer Meeting, Buxton, June, 1935. Demonstration of Laboratory Methods in General Practice by Mr. G. O. Davies, M.V.Sc., of Liverpool University. Demonstration of Actinotherapy and X-ray diagnostic apparatus by Messrs. Watson and Sons (Electro-Medical), Ltd.

5. General Meeting, Manchester, October, 1936. "The Examination of the Unsound Horse," by Mr. T. Wilson, of Nantwich.

6. General Meeting, Manchester, December, 1935. Clinical contributions by members of the Division.

The meetings were all held under the Chairmanship of the President, Mr. R. C. Locke. The average attendance at these meetings was 29 as opposed to 22 in the previous year. A pleasing feature was the appearance of several of the older members at these meetings after a prolonged absence. There is a notable increase in interest among the younger graduates and senior students.

Meetings of a clinical nature retain their popularity, this in spite of the difficulty in persuading members to take part in an organised programme.

Proceedings of Council.—Four Council meetings have been held during the period under review. All were held in Manchester. The average attendance of eleven has been maintained for the past three years and is very satisfactory. Council were elected at the Annual General Meeting of 1935, their election taking place under the New Rules of the Association by which 15 members are elected, five of whom retire annually by rotation.

Obituary.—Mr. G. Boulton, Sandbach.

Resignations.—Professor J. T. Share-Jones, Messrs. C. W. Elam, A. C. Shuttleworth, H. V. Hughes, H. W. Miller, G. McKee, W. Tweed, E. F. Hardwicke and C. Tracey.

Election of New Members.—Messrs. F. W. Priestley, Manchester; J. Brennan, Lancashire County Council; C. Tullis, Wallasey; Major R. F. Bett, Mottram; R. S. Howe, Buxton; Miss K. Massey (S.); Miss V. Tillemont-Thomason, Liverpool; J. C. Baird, Liverpool; C. A. Stewart, Nantwich; G. Holmes, Manchester; A. S. Ratter, Liverpool; and R. Greenhalgh, Lancaster.

Representatives on the Council of the N.V.M.A.—Messrs. G. H. Locke, J. Holroyd, W. Woods, T. Wilson, and the Hon. Secretary.

I should like to thank all those gentlemen who so kindly co-operated with me in arranging meetings and programmes. In particular, I desire to acknowledge the willing support and encouragement of my fellow officers, which has served to lighten the load placed upon me.

It was proposed by Mr. G. Mayall, and seconded by Mr. E. J. Burndred, that the report be adopted. The proposition was carried unanimously.

Hon. Treasurer's Report.—In the absence of the Hon. Treasurer, Mr. Noel Pillers, particulars of the Financial Statement for 1935 were given by Mr. J. H. White, one of the Auditors. On the proposition of Mr. C. F. Shawcross, seconded by Mr. G. C. Webster, it was unanimously resolved that the Financial Statement be approved and adopted.

Induction of the New President

The retiring President, Mr. R. C. Locke, referred to the great pleasure it gave him to ask Mr. C. F. Shawcross to take the Presidential Chair. He paid tribute to Mr. Shawcross as a well-known general practitioner who was keenly interested in the Association and said that he was confident that its affairs would be safe in Mr. Shawcross's keeping. Mr. Locke went on to say that before asking Mr. Shawcross to take the Chair, he wished to thank all the members who had supported him during his year of office. There had been an increase in attendances and he hoped there would be a still greater increase during the ensuing year.

Mr. Shawcross took the Chair amidst applause and presented his Presidential address, which was in the following terms:

PRESIDENTIAL ADDRESS

Let me first of all thank you for the great honour you have conferred upon me in electing me President of this Association for the year 1936. Whilst fully appreciating the honour of this exalted position, I am accepting office with some misgiving as to my ability to live up to the high standard of service to which you have been accustomed from your past Presidents.

I cannot lay claim to the Presidential pedigree enjoyed by our retiring officer, which has stood him in such good stead in his year of office, and has helped, with his own personality, to make him one of the best of a long line of good Presidents. I will, however, make one promise, and that is to do my best to prove myself worthy of the confidence you have reposed in me.

For two years in succession our Presidents have expressed some difficulty in preparing their inaugural addresses, and I am now in a position to vouch for their truthfulness.

I think I cannot do better than start the political part of my address at a point in Mr. Locke's address of last year in which he states that he believes "the future holds great prospects for the veterinary profession—the main requirements being unity and a willingness of all branches to work together."

I am absolutely in agreement with that statement, if we can maintain unity. The present is a crisis period in the life history of our profession, and any split in our ranks now will definitely set us back for many years to come. Unity is absolutely essential if we are to give full weight to any resolution which the Councils of the Royal College of Veterinary Surgeons and the National Veterinary Medical Association wish to put forward for the better utilisation of the veterinary services of the country in carrying out duties under the Contagious Diseases of Animals Acts and Orders and the Milk (Special Designations) Orders.

Both Mr. Holroyd and Mr. Locke refrained from making any controversial remarks on the subject of whole-time or part-time inspectors, and whilst I appreciate their desire for a peaceful reign, I think the time is now ripe, if not over-ripe, when differences of opinion should be thrashed out by veterinary associations throughout the country. My personal opinion, from what I can gather from the *Veterinary Record*, is that the general trend, in spite of occasional outbursts, is in the direction of peaceful negotiation and compromise. The members of this Association, whether whole-time or part-time officers, have always struck me as being so friendly one with another, even if their opinions differ, that I cannot think the barriers to rational agreement are insurmountable. The Lancashire Association may be unique in this respect, and we should take full advantage of this happy state of affairs to push forward with a policy of tackling *early*, problems of national veterinary service in which there appears to be some doubt as to the best means of utilising the various branches of veterinary services. An early decision and resolution from us may so influence other associations in their deliberations that mistakes may be remedied before it is too late.

With this object in view I would suggest that whenever a new Order comes out or is proposed, which is likely to affect us—as, for instance, the proposed Milk (Special Designations) Order of 1936—the committees of veterinary inspectors of Lancashire and Cheshire should immediately consider the Order and be prepared to bring their opinions in concrete form before a general committee of this Association.

As regards the question of whole-time *versus* part-time inspectors, I think we must realise that the whole-time county veterinary inspector has come to stay. Personally I am of opinion that the amount of work provided by the Tuberculosis, Milk and Dairies, and Milk (Special Designations) Orders, warrants the employment of a limited number of senior veterinary inspectors in big milk-producing counties, to administer these Orders—but I cannot see the necessity or wisdom of their doing all the executive work with an army of junior veterinary inspectors to the exclusion of experienced part-time inspectors and practitioners in the county, who are necessary in fair numbers to agricultural communities if sick animals are to get adequate attention—particularly in breeding seasons of the year. The extra money obtained from inspection and tuberculin testing—although perhaps not a vast sum in itself—enables a practitioner to employ the help of an assistant to cope with rush periods. If a newly-qualified man takes an assistantship for a few years in a mixed practice with inspection work and tuberculin testing, I feel sure he will gain a better general practical education, and be more fitted for a senior inspectorship than if he joined the ranks of junior inspectors with little or no post-graduate practical experience of general diseases.

We must remember that most of the senior whole-time inspectors of to-day have had years of experience in practice and other branches of veterinary service before they attained their present positions. This experience will be lacking in inspectors of the future. Many of the veterinary students in our colleges to-day have joined with the one object of obtaining an appointment when qualified and have no intention of seeing any more practice than is necessary to obtain the diploma.

If this flooding of the counties with junior inspectors at salaries of £400 rising to £500 per annum continues, four-fifths of the veterinary practitioners will be reduced to the same monetary level, and although this sum may look attractive to newly-qualified men, it will not be sufficient to keep house, wife and family and raise children to the professional classes. A proportion (about one-tenth) of the junior inspectors will rise to chief inspectors after some years, but the majority will have to be content for the greater part of their lives, on this low scale of remuneration.

It seems to me that it would be better to pay good salaries to a limited number of senior whole-time inspectors who would be expected to co-operate with part-time inspectors and practitioners, and recruit fresh inspectors, as vacancies occur, from the ranks of veterinary assistants with some years of experience and a post-graduate course. In this way we should raise veterinary surgeons bound together by common knowledge and experience, "each for all and all for each" and yet capable of taking positions in any branch of veterinary service.

I do not propose to take up any more time in discussing other fields of veterinary activity as Mr. Locke covered the ground pretty thoroughly last year, and anything I could say would only be in the nature of reiteration; but I should like to repeat his appeal for better attendances at meetings. An improvement in attendances has been noticeable in the last two years, which is encouraging, but an average attendance of 29 out of 150 members can hardly be considered satisfactory.

I know from my own experience the difficulties of leaving a single-handed practice. Until I secured an assistant I was perhaps one of the worst offenders, but, like a sinner come to repentance, I can now tell you how much I regret the many meetings I have missed attending.

The objects of this Association are "the promotion and advancement of veterinary and allied sciences, and the support and furtherance

of the status, interests and prestige of members of the Association." Attendance at these meetings carries these objects further. It re-awakens that early enthusiasm for our particular job—it helps us to do that job better by improving our knowledge and interest. It creates good fellowship with our fellow members, and it begets a spirit of live and let live.

Vote of thanks to the New President.—A hearty vote of thanks to the new President for his able Presidential Address was proposed by Mr. J. Holroyd, seconded by Mr. J. H. Wright and enthusiastically carried.

Vote of thanks to the Retiring President.—The President, Mr. Shawcross, who proposed a vote of thanks to the retiring President, Mr. Locke, said that Mr. Locke had done good work for the Association and it was reflected in the increased attendances at meetings. He had occupied the chair in a very efficient manner and he (Mr. Shawcross) looked forward with pleasure to the time when he would again be elected as President.

Mr. Holroyd said it was not necessary for the proposal to have a seconder, as it was obvious from the applause that it was seconded by all.

Mr. R. C. Locke expressed his thanks in suitable terms.

Discussion.—The President then called upon Mr. H. G. Lamont, M.Sc., M.R.C.V.S., to open a discussion on the recently-published Spahlinger Test Report.

Discussion on the Report of the Northern Ireland Experiments with the Spahlinger Vaccine

Mr. H. G. Lamont: I should like to thank you for the compliment you have paid me in asking me to open a discussion at a meeting of the Lancashire Division. I have been assured that the Lancashire Division is a virile one, and from the attendance to-day I can well believe it. I must confess, however, that I accepted your invitation with considerable diffidence. It is unusual for one to be asked to open the discussion on a report that one has helped to prepare. However, when I was informed that this Division was keen to discuss the Spahlinger Report, I felt that it might be possible for me to clear up dubious points and perhaps amplify others.

In opening this discussion you will appreciate that I can add but little to what is contained in the report on the Spahlinger experiments. I have, of course, heard and read various criticisms of the report, some of which probably will be made again at this meeting. I do not propose to anticipate all these criticisms, but when any point is made I will, if possible, endeavour to clear it up.

For many years the name Spahlinger has been associated with tuberculosis. Like everyone else, I derived certain vague impressions from the public Press and also from various people who claimed to have met Mr. Spahlinger. The sum total of my knowledge, however, was that he had something to do with tuberculosis, and that he was a Swiss and claimed no medical or veterinary qualifications.

The attention of the Ministry of Agriculture in Northern Ireland was drawn to an experiment which he had conducted in Norfolk and the results appeared so striking that the authorities in Northern Ireland determined that, if at all possible, they would secure a supply of vaccine from Mr. Spahlinger and carry out an experiment. The present Permanent Secretary to the Ministry of Agriculture in Northern Ireland, who was primarily responsible for getting in touch with Mr. Spahlinger, quite realised that that gentleman had no professional qualifications in the sense that these are generally understood, but then neither had Pasteur, and it is rather a curious coincidence that some of the greatest discoveries in the various branches of science have been made by people unconnected with those branches. Personally we felt that if Mr. Spahlinger had a dead vaccine which on injection into cattle prevented them from developing tuberculosis on exposure to infection, his possession or otherwise of a medical or veterinary qualification was a secondary consideration.

Spahlinger's theory in the preparation of his vaccine is that the tubercle bacilli should be allowed to grow on body fluids or tissues which have been unaltered by heat or the addition of chemicals. His view is that by growing organisms on artificial media, changes are produced in their structure and virulence and that they are no longer capable of immunising animals against fresh virulent strains. He takes the view that an organism growing in the animal body is different in structure and virulence from one growing on artificial media, such as coagulated egg albumen. I do not seek to defend this view, but I will remind you that it is a common experience to discover that organisms lose their virulence when grown on artificial media, and that if they have been grown sufficiently long in artificial media, it is impossible to restore their original virulence even by passage through the animal for which they were originally pathogenic; quite a number of examples will no doubt occur to you, *e.g.*, organisms of the Pasteurella group, *Br. abortus* and, of course, the B C G anti-tuberculosis vaccine, etc., etc. After growing his organisms on unaltered body fluids, Spahlinger allows them to die naturally, the idea again being that killing by heat or the addition of disinfectants produces changes in the substances in their

structure. One does realise that heating can alter the constitution of certain carbohydrates and also of proteins, but I do not know of any work by other investigators which either confirms or refutes these views. In this connection I have been informed indirectly that Spahlinger uses a light ray to hasten the death of the organisms. This, I may say, is only hearsay, so far as I am concerned, but if it is true it certainly shows that Spahlinger is well ahead both in his ideas and methods.

So much for the details which lead up to the experiments and the method of preparing the vaccine.

The next point which I wish to raise is the experiment proper. Originally it was intended to divide the animals into two groups: (1) a vaccinated group and (2) a control or unvaccinated group. Spahlinger, however, wished to investigate, still further, certain points; and other small groups as described in the report were included at his request. Mr. Spahlinger visited Northern Ireland and carried out the vaccinations personally or supervised them. I may say that after this visit to Northern Ireland, and inoculation of the animals, Spahlinger had nothing further to do with the experiments, but was content to leave the observation of the results to us.

The animals which were used in the experiments were from grade "A" tuberculin-tested herds. Eighteen of them were from a small herd of Galloway cows crossed with an Aberdeen Angus bull. The sire and dams had passed the double intradermal tuberculin test. The calves were born out of doors and were reared on their dams. The remaining calves were also from cows which had passed the tuberculin test and were removed from their dams at birth and reared out of doors on the experimental farm on grade "A" tuberculin-tested milk. The calves were born during the period June to September, 1931, and were vaccinated on December 2nd, 1931, so that at the time of vaccination they were approximately four to five months old. It has since been suggested that it would have been fairer to Spahlinger if we had submitted the calves to the double intradermal tuberculin test. In the first place, Mr. Spahlinger did not want the animals to be tuberculin tested, and in the second, will anyone seriously suggest that these calves were likely to be infected? Actually I may state that it has been our experience on these farms that the home-reared stock has invariably passed the tuberculin test and anyone with experience of building up a grade "A" (T.T.) farm will appreciate this point.

As already mentioned, Mr. Spahlinger divided the animals into a number of groups and of these groups there are two of primary importance, *viz.*, No. 3, which contained eleven animals and the control group of seven animals.

The animals in Group 3 were vaccinated with what Mr. Spahlinger described as his new simplified vaccine and which he stated was prepared in 1929 and was therefore at least two years old at the time of vaccination. We observed that the vaccine was withdrawn from a sealed parcel and on examining this parcel it was noted that it had been deposited in a well-known London bank from August 17th, 1931, to December 1st, 1931.

The vaccine was of thick creamy yellow appearance and was diluted with normal saline before injecting. We noted that the dosage varied and that the quantities of the thick creamy yellow material used were relatively small. Actually the dose varied from 0·2 c.c. to 0·6 c.c. It was explained that this thick cream-like material was the actual growth of tubercle bacilli which had been removed from the specific media.

Mr. Spahlinger, in point of fact, utilised this experiment with a view to determining (1) the most efficient dose of vaccine and (2) the best route of administration. This may seem rather curious, but you must remember that Spahlinger had no doubts whatever about the efficacy of his vaccine. It reassured us to note his confidence and, in fact, his only worry seemed to be that we would not give the animals a stiff enough test dose.

A stipulation was made regarding the test dose, *viz.*, that it should be prepared from tubercle bacilli isolated and grown in Northern Ireland. Seven different strains were isolated and utilised for the composition of the test dose. Unfortunately we had not sufficient time to arrive at the most suitable lethal dose, but profiting from the experience of other investigators we decided to use 2·5 milligrammes of dry growth suspended in saline. Each animal received an exactly identical dose. The virulence of the cultures used can only be estimated by the results produced on the control animals. If one desired to compare their virulence with that of the strains used in other experiments such factors as the age and breed of the animals, the system of management and the method of growth of the cultures would have to be taken into account. To suggest that the virulence was less than that of cultures used in other experiments is pure speculation, as one would require to run comparative tests on animals of the same age and maintained under similar conditions.

In the control group five out of the seven animals died of acute tuberculosis within 25 to 73 days, the average period being 43 days.

In the vaccinated group, no deaths were recorded until the 607th day, when one animal died. This was the only death. This particular animal, No. A4, was vaccinated intravenously and received the smallest dose of vaccine used,

viz., 0·2 c.c. It developed tuberculous meningitis. In experiments carried out by workers with B C G vaccine, this sequel to the test dose was a comparatively common occurrence and in fact has been commented on in the Second Report (1931) of the Director of the Institute of Animal Pathology, University of Cambridge. A study of the temperatures recorded in the vaccinated animals and in the control animals is very interesting. In the control group the injection of the test dose, if followed by a preliminary rise in temperature, was generally succeeded by a few days in which the temperature approximated to normal. But at the end of the first week the temperatures commenced to soar in all instances, and were maintained at a consistently high level until the death of the animal. Even in the two control animals which survived, a similar temperature chart was recorded, but in their case the temperature commenced to fall about the third or fourth week. In the vaccinated animals a sharp rise of temperature which persisted until the third or fourth day was recorded. The temperature then declined to normal and remained normal subsequently.

The further history of the animals was uneventful. Four out of the five heifers in the vaccinated group became pregnant and calved, one of the two surviving control animals was also mated and reared a calf.

The *post-mortem* examinations were very interesting. Lesions were found in all the animals and even in the surviving control animals, these appeared to be of a non-progressive nature. Only one animal was totally condemned by Mr. McLean, the Belfast City Veterinarian. This animal had a tuberculous udder and fairly widely disseminated lesions. It was in quite good condition and improved in condition after calving until it was slaughtered some five-and-a-half months afterwards. The lesions in the other animals have been detailed fully in the report and I may say that Mr. McLean, the Belfast City Veterinarian, and Dr. Trimble, the City Tuberculosis Officer, both considered them to be old and of a non-progressive nature, and that the carcases were fit for human consumption. So that the case for the vaccine is, five out of seven control animals died in an average time of 43 days and of the vaccinated animals one death occurred in 607 days and when the surviving animals were killed only one carcase was totally condemned. One is forced to conclude, therefore, that a very high degree of immunity was conferred by the vaccine. Obviously, of course, it would have been much more satisfactory if all the control animals had died, but five out of seven deaths from acute generalised tuberculosis in from 25 to 73 days is a useful percentage. No other vaccine utilised in the same manner in this country has given results remotely approaching these.

It may interest you to know that the vaccination sites were carefully examined at *post-mortem* examination without detecting anything suggesting evidence of the vaccine. This is contrary to my experience with B C G vaccine.

Personally I do not think the immunising properties of an anti-tuberculosis vaccine should be tested by the intravenous administration of living virulent tubercle bacilli. Immunity should be tested by exposure to natural infection and intensified if necessary, but one always has the necessary evidence on this point from the control animals. This would be a much more suitable method in the case of the Spahlinger vaccine, for one might suggest that it would have been more appropriate to use either natural infection or strains which were grown on specific media. The strains which we used were grown on an artificial medium, *viz.*, Petroff's egg medium.

In opening this discussion on the two groups which are really the important ones, from our point of view, there are many points which one might make, but I feel that these could be more usefully raised by other speakers, and if I can amplify these points perhaps your President will permit me to deal with them if the necessity arises.

Regarding the other groups of animals which are referred to in this report—Group I does not merit any special mention except to note that the double intradermal tuberculin test was applied to three animals in this group after vaccination and that they reacted. In the report we have drawn attention to the fact that these animals died and that three animals not so tested lived.

Group II.—The animals in this group were treated with an experimental vaccine prepared from cultures grown on artificial media and then transferred to specific media. One of these animals, *viz.*, A21, was submitted to the double intradermal tuberculin test about three weeks before receiving the test dose. This animal died. The remaining animal in this group was tested immediately before receiving the test dose and lived. It received twice as much vaccine as A21.

Group IV was considered by us to be an additional control group. We were given to understand that these two animals were injected with filtered extract of tuberculous lesions prepared in 1922. This filtrate, in an earlier experiment, had affected the animals in such a way that they were more susceptible and had died in a much shorter time than the controls. Mr. Spahlinger explained that the filtrate was now comparatively old and might have gone off. Privately, we looked on this group as a control group and these two animals

behaved in a manner very similar to the controls.

Group V.—The animals in this group were injected with the specific culture medium on which the vaccine bacilli had been grown. It would naturally be expected to contain the products of growth of the bacilli and any toxins produced. Its use was purely experimental and Mr. Spahlinger was of the opinion that depending on the quantity used and the method of vaccination, it might be possible either to immunise an animal or render it hypersensitive.

Both these animals behaved very similarly to the animals in Group III, which were vaccinated with the bacilli removed from the medium. One of the carcases was condemned at *post-mortem* examination. It contained fairly widely disseminated chronic lesions. The carcase was in fair condition. The other carcase contained only a few non-progressive lesions.

It is of interest to record that these two animals were submitted to the double intradermal tuberculin test on two occasions, *viz.*, March and May, before receiving the test dose in June—both animals reacted. The only discussion that one can offer regarding the results of the effects of tuberculin testing is that it would be interesting to carry out identical experiments with a view to noting if similar results would again follow.

I am afraid I have already trespassed too long on the time of the meeting and I should like to conclude these remarks by stating that I have met Mr. Spahlinger on three occasions and that on each occasion I was greatly impressed by his ability and personal charm. I can also add that he is a first-class man at handling his apparatus or inoculating calves.

With the Chairman's permission, I should like to show a few slides illustrating some of my points.

Professor J. F. Craig: I desire, at the outset, to express the great pleasure that I feel in being afforded the privilege of attending this meeting at the invitation of the President of the Association and more especially when the discussion on the experiments with the Spahlinger vaccine in Northern Ireland is being opened by an old student and friend of mine, Mr. Lamont.

Mr. Lamont has given us a very lucid and interesting account of these experiments and the conditions under which they were undertaken, and the references to the personality of Mr. Spahlinger introduced a note which has a distinct bearing on the course of the experiments.

There can be nc doubt that any advance that is to be made in the control of bovine tuberculosis will be directed to the provision of any increased resistance to infection. Ever since the discovery of the tubercle bacillus, many agents or vaccines for this purpose have been introduced from time to time but have, after preliminary or extensive trials, been proved to be of little value or have dangerous properties and have been discarded.

At the present time there are three vaccines which are more or less in the public eye and are being tested as to their value. They are (1) the B C G vaccine, (2) the Diaplyte vaccine of Dreyer which was used experimentally in a large dairy herd in Denmark, and (3) the Spahlinger vaccine. The value of the last named vaccine has been frequently discussed in the lay Press and now we have for the first time been provided with the reports of a drastic test carried out in the North of Ireland. In determining the value of this or other vaccines for its wide application in the field there are three qualities with which it should be endowed, *viz.*, (1) it must be innocuous, (2) it must be readily and not too frequently applied, and (3) it must confer a high degree of resistance to tuberculosis which will last for a considerable time, and it may be admitted at once that this vaccine of Mr. H. Spahlinger is possessed of the first quality, judging from the described process of manufacture.

Judging from the time of preparation of the culture of tubercle bacteria, these organisms must have died out by the time the vaccine was ready for use. It is also evident that if it is efficacious and one injection only is required, the vaccine in respect of the second quality is one which can be readily applied in practice.

As regards its efficacy, one must confess that it is a pity that the trial in the North of Ireland was not a clean-cut one and that the experimental cattle were not divided only into two groups, the vaccinated group and the control group. The introduction of different types of protective agents and the division into a number of groups militated against the value of the test, but that defect was not the responsibility of the authors of the report. The most important group of vaccinated animals was Group 3 in which the vaccine was prepared in 1929 and that is the group to which one would pay most attention in estimating the degree of resistance conferred upon the test animals.

In forming a judgment one notes that the test virulent dose was injected intravenously six months after vaccination and therefore one cannot say for how long afterwards protection might have been provided.

As regards the results, it is apparent that the test of immunity was a very drastic one and would compare favourably with exposure to natural infection.

From the evidence before us, there is no doubt that a very considerable amount of protection was provided by this vaccine when one compares the control group with Group 3. But in saying that, one must also note that the protection was not complete in the sense that all the vaccinated animals presented lesions of tuberculosis to a

varying degree when examined *post-mortem*, and here again the veterinary surgeon looks upon bovine tuberculosis from a different angle from that of the physician. He is not content with the absence of symptoms as indicating the absence of disease, he is prepared only to consider that the animal is free from tuberculosis when there are no lesions in the body.

When one contrasts this test with the original experiments in connection with the use of B C G vaccine, one has to record that the latter gave the more favourable results and that the animals vaccinated with the B C G vaccine remained free from lesions even although the test doses of virulent tubercle bacilli were given in much the same way. The subsequent tests were, of course, not nearly so favourable.

It is also curious to observe that in both the Spahlinger and B C G experiments, one of the cattle became affected with verminous bronchitis and whereas with Spahlinger vaccine tuberculous meningitis was set up, the bovine protected with the B C G vaccine remained free from the disease.

From the North of Ireland experiments it must be concluded that the Spahlinger vaccine conferred a certain degree of protection against bovine tuberculosis and it is worthy of a further and wider trial under experimental conditions. It is to be hoped that when further experiments are decided upon, larger numbers of cattle will be used, that the trial will be a clear-cut one and that there will be only two groups, the control and the vaccinated, and last of all, that a less drastic test of protection be adopted and that in the way of exposure to infection over a considerable period of time. One must add that if these further experiments demonstrate that the Spahlinger vaccine will provide an adequate protection over a period of years to cattle exposed to infection, it will prove a great boon to owners of herds highly infected with tuberculosis even though it may not in all cases prevent infection, provided that it reduces the incidence of the disease. At the same time, there is nothing in these or other experiments which would suggest a change of policy in the present methods of eliminating tuberculous herds where that is practicable.

Mr. H. T. Matthews referred to the action of the Past President in thanking Professor Craig for coming along that day. He would like to record his appreciation of his, Professor Craig's, speech to that Association and to express the hope that the next time the Professor spoke, it would be as a member and not as a visitor. (Hear, hear.) His predecessor, the late Professor Gaiger, was a tower of strength to the Association. Speaking in regard to Mr. Lamont, Mr. Matthews said he was somewhat in a quandary because Mr. Lamont was a guest of the Association and guests were accorded special consideration. He might say, however, that he thought Mr. Lamont was brave to come there at all. Since he had listened to him, however, he appreciated the fact that Mr. Lamont had made clearer many points which were somewhat obscure in the report. Mr. Lamont had exonerated himself in the sense that he had little control over the test and he had not designed it. He would like to ask Mr. Lamont if he had attempted to produce this vaccine on the directions given in addendum B. Many present would remember the occasion about four or five years ago, when Mr. Spahlinger's formula was disclosed to a waiting world, and the disappointment which followed. Was the new vaccine better than the one produced at that time? Mr. Matthews reminded the meeting that there was a claim, prior to the experiments in Northern Ireland, that Spahlinger's vaccine could prevent calves from becoming infected at all—what was the result? Twenty-seven calves vaccinated with all kinds of material and by various methods eventually all showed the presence of living tubercle bacilli. He thought Mr. Spahlinger must be profoundly disappointed with the results obtained. Mr. Matthews went on to say that he thought the presentation of the report was difficult to follow. He understood these experiments were to be continued. If that was the case he hoped that Mr. Lamont and his team of co-workers would have complete control of the design and conduct of the experiments. In the report it was said that the reason for the inclusion of the subgroups was dealt with clearly in the section which followed. He had failed to find any adequate reason whatever. He felt that the primary principles of scientific experiment had been violated in thus multiplying the variables. Would Mr. Lamont, in his reply, give them some indication of what he proposed to do in his next experiment to test this vaccine? One other point—the calves dealt with were shielded from infection for four to six months and then for a further six months after vaccination. If that shielding were necessary then he, Mr. Matthews, submitted that the vaccine was of little practical value so far as this country was concerned.

Major A. B. Mattinson saw the shortcomings of the report but took a more tolerant view of the difficulties. With reference to the suggestion contained in the report that the animals were subjected to an intense natural infection, he was far from satisfied that this was the case. They were either tuberculin-tested or were reared from tubercle-free cattle, and he was not sure that injecting cattle with tubercle bacilli necessarily made them infective. He instanced the fat, healthy-looking beast which suddenly developed acute clinical tuberculosis, and said that such an animal was not necessarily infective until that acute condition became manifest; in fact, he thought the likelihood of infection was small. The report stated that some of the animals were subjected to the strain of calving, lactation, etc.,

but that was a normal thing and no different from the strain of living. All cattle were subjected to those strains and he did not think it worth mentioning in the report. Major Mattinson thought that too much had been made in the report about the manner of preparation of the test doses. He did not consider that the so-called standardisation of these living test doses implied any reasonable degree of accuracy, and said that standardisation imported other factors besides an inaccurate and hypothetical count of the alleged number of bacilli injected; the subject's capacity of resistance was wholly unknown, and was of at least equal importance. He referred also to the suggestion made that two of the animals which died did so because they had been subjected to the tuberculin test prior to inoculation with the vaccine. The quantity of tuberculin injected was very small and if it was such a dangerous thing he wondered whether it should be used at all. He thought that to anyone reading the report, especially if he were a layman, the impression might easily be conveyed that the injection of tuberculin was attended by great risks, either by lowering the bodily resistance to infection, or actually inducing death in an animal exposed to serious risk of infection. He would like to ask Mr. Lamont why the report did not explain the reason why the vaccine in one sub-group was suspended in olive oil. Major Mattinson concluded his remarks by saying that he was in favour of further experimentation with the vaccine.

Mr. G. C. Webster was of the opinion that experiments such as the one under discussion should not be taken too seriously until more definite results had been obtained, which would take many years under the best conditions. The experiment was of academic interest but as a practical policy to develop, it was wrong. Naturally economics, not sentiment, controlled our outlook. The financial inducement now being given and being further considered, if developed, was a more rational line of action to encourage.

Mr. G. Mayall thought a good many of the critics had forgotten that the subject under discussion was an experiment. If there were no experiments how could they advance? He agreed with Professor Craig that tuberculin testing alone would never eradicate tuberculosis. Destructive criticism was of little value and he was struck by the contrast between the remarks of Professor Craig and those of Mr. Matthews. The latter speaker put little that was constructive before them. Experiments were essential and sometimes took up a very long time before anything satisfactory was discovered. He admired the courage of the North of Ireland men and hoped they would go on and prosper. From the practitioner's point of view, if the vaccine was successful it would seem to be most important that it should protect heifers joining the herd under farming conditions—that was, when they calved for the first time.

Mr. K. D. Downham expressed his interest in the report, but said that he was surprised at the small number of animals used. He thought the experiments showed that there was "something in" the Spahlinger vaccine. The North of Ireland Government were to be commended on attempting something which the British Government would not do. He thought that a further experiment should be carried out, Mr. Lamont and his co-workers being given a free hand.

Mr. Lamont, in his reply, said that he was quite unabashed by the criticism; in fact, he rather expected it. No experiment had yet been conducted which did not meet with some criticism: unfortunately, the criticism was apt to be more destructive than constructive. He thanked Professor Craig for his kindness when discussing the report. He could inform Mr. Matthews that they had succeeded in Northern Ireland in growing tubercle bacilli according to the Spahlinger formula and they hoped ultimately to produce the Spahlinger vaccine. He was under the impression that Mr. Matthews thought that that could not be done. He had heard—and he surmised that Mr. Matthews had heard it too—that two scientists in England had tried to grow the tubercle bacillus in accordance with the Spahlinger published formula and had failed. He and his colleagues had tried without any assistance from Mr. Spahlinger beyond the published account and had been successful. He thought it unfortunate that prejudice should be allowed to enter into this matter. There might be some small details regarding the bottling and storing of the vaccine, which were not published but he thought that Mr. Spahlinger would tell them how to do it when they were ready. There must be a beginning and an end in experiments and Mr. Spahlinger had stated a new line and they had to admit that the present results were definitely encouraging. The results showed that the experiment were worth proceeding with, but he was not going to discuss policy—they were discussing this particular experiment.

With regard to the sub-groups, Mr. Lamont said he had tried to explain the reasons why Spahlinger created sub-groups. Group 3 and the control group were the ones that mattered.

Mr. Matthews' point regarding the animals being shielded from infection from four to six months did not occur in the report at all. Spahlinger intended to vaccinate the animals at birth, but it was not possible to arrange that. The age of the animals on vaccination was accidental and not designed. He appreciated the fact that Mr. Matthews criticised the report and not him personally, but he was responsible for the scientific section of the report and he thought it to be fairly intelligible. He and his colleagues

had complete and unfettered control of the experiment during the whole of its duration.

Mr. Mattinson had raised the question of how the animals had been subjected to a natural infection. His reply was that if one had a number of animals using the same watering and feeding trough and shed, and one of the animals had tuberculosis, one was justified in saying that that animal was infective and that the others were therefore subject to natural infection. Five of the control animals died in a short time after the test doses had been administered—some actually died with their heads in the watering trough used by all the animals. One of the animals in Group 4 remained a chronic case of tuberculosis. It lived for about two years in contact with the other animals and it was known that the animal was discharging infective sputum. One animal had a tuberculous udder, and at the end of the experiment, of the seven calves born, three showed lesions of tuberculosis on *post-mortem* examination and they must have got the infection from somewhere. The reason that mention was made of the heifers having been subjected to the strain of calving was because it was well known how often an apparently healthy animal developed rapid tuberculosis after parturition. Regarding the two animals referred to as having natural immunity, Mr. Lamont explained that it was considered that these animals must have had some degree of natural immunity because they had lived so long and there was no other apparent explanation. He had tried to get information relating to natural immunity, but had never obtained any really satisfactory evidence. So far as the result of tuberculin testing on the effect of the vaccine was concerned, what really happened was that the animals in Group 1 were tuberculin tested one month before the injection of the test dose. It was not suggested that the tuberculin was likely to cause tuberculosis, but it was mentioned in the report in justice to Mr. Spahlinger, who did not think that the animals should have been tested. It certainly was peculiar that the tested animals died and that the three untested lived. With reference to the suspension of vaccine in olive oil, this was done to delay absorption. B C G vaccine which he (the speaker) had obtained from France, was suspended in oil. In reply to Mr. Webster, he did not think that that meeting had been called to discuss policy. That was a big subject and should occupy another meeting. The discussion on that occasion was confined to a particular experiment. Mr. Mayall had dealt kindly with the experiment and he, Mr. Lamont, appreciated his remarks. With regard to the small number of animals employed in the experiment, Mr. Lamont pointed out to Mr. Downham that it was a question of expense. In conclusion, he thanked the members for their patient hearing and said he had enjoyed the discussion.

Vote of Thanks.—Mr. H. T. Matthews requested the privilege of proposing a hearty vote of thanks to Mr. Lamont. They had crossed swords and he had been accused of being purely destructive in his criticism, but he would value the opportunity of expressing the thanks of the meeting. He emphasised the hope that in the coming experiments in the North of Ireland Mr. Lamont and his co-workers would have complete control and also that Mr. Lamont would keep the calves alive so as to determine the length of time the degree of resistance lasted.

Mr. G. O. Davies, in seconding the vote of thanks, said that he had refrained from taking part in the discussion, and having listened to Mr. Lamont's very able reply he felt that he had been wise in so doing. They had had a treat that afternoon and a most instructive discussion, which had added to the value of the report. He could appreciate quite readily the difficulties under which Mr. Lamont had been working and he realised the difficulty of defending an official publication before a critical audience.

The proposition was carried with acclamation.

There being no other business, the meeting was declared closed.

A. L. Mullen, *Hon. Secretary.*

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SOUTHERN COUNTIES VETERINARY SOCIETY*

ANNUAL MEETING AT SALISBURY

The 52nd annual general meeting of this Society was held at the Red Lion Hotel, Salisbury, on Thursday, March 26th, and was attended by some 20 members and visitors. The President, Mr. J. F. D. Tutt, F.R.C.V.S., occupied the chair and others who signed the attendance book were Colonel H. J. Holness, D.S.O. (Southern Command Headquarters), Major P. S. Sparling (Tidworth), Major R. M. Bamford (Larkhill), and Captain C. R. Porter (Tidworth), of the Royal Army Veterinary Corps and Messrs. F. Beckett, G. Warnock Begg, E. Brown, H. S. Caldwell, A. D. Campbell, A. W. Hart, J. D. McLauchlan, W. A. Milligan, A. E. Roberts, H. C. Rockett, W. H. Simpson, H. H. Skinner, J. B. Tutt, W. J. Barclay Watson, J. Stewart Wood, and J. B. White (Hon. Secretary).

Apologies for inability to be present were announced from Sir Frederick Hobday, Miss Cust, Dr. Sheather, and Messrs. Barron, Klyne, Martin, Parr, M. E. White, and B. Gorton.

The minutes of the previous meeting, as published in the *Veterinary Record* were taken as read and were confirmed.

*Received for publication, April 24th, 1936.

Correspondence.—(1) From the Central Veterinary Society, enclosing copies of resolutions on the free treatment of the sick animals of the poor. There being no response to the President's invitation for comments on these, the Hon. Secretary observed that he took it the members did not wish any action to be taken on this matter.

(2) From the Yorkshire Association, asking for support for Mr. Watson, of Bradford, in the approaching election of members of the Council of the Royal College. The President mentioned that since the Yorkshire Branch had promised to give him their support, he thought they might very well reciprocate. Mr. Watson was, he understood, a general practitioner and they wanted to get more practitioners on the Council.

Co-operation Between Branches of Veterinary Science.—Some discussion took place on the reply received from the N.V.M.A. to the resolution re this matter forwarded to that body.

The President mentioned that he had brought the position of the Advisory Officers to the notice of the Ministry and he had received word that the matter would receive consideration.

Elections to Membership.—Mr. G. Warnock Begg, Mr. J. D. McLauchlan and Mr. W. A. Milligan, who had been nominated for membership at the previous meeting by Mr. Beckett, seconded by the President, were formally elected to membership on the proposition of Mr. White seconded by Mr. J. Stewart Wood.

Hon. Secretary's Report

The Hon. Secretary next presented his annual report. In this, Mr. White said the Society had had a moderately successful year without there being anything of special importance to record. One special and four ordinary meetings had been held during this period. The last annual meeting was held at Salisbury, when Major Dunkin gave a paper on "Tuberculin and Tuberculin Testing." The summer meeting was held at Bournemouth, the subject for discussion being "The Agglutination Reaction," a paper on which was presented by Dr. Lovell. At Southampton in September, Professor Miller described in his paper "The Difficulties and Complications of the Equine Pregnancy Diagnosis Test." The last meeting of the year was at Winchester in January, the subject being "Anaerobes and Disease in the Domestic Animals," introduced by Mr. N. S. Barron. A special meeting of the Society was held in May at Winchester to consider the question of the fees to be charged for work done under the Accredited Herds Scheme. The average attendance at these meetings had been nine members and five visitors. During the year two members had resigned, these being Mr. W. Caudwell and Mr. J. T. Turney, while the only new member was Mr. M. E. White, of Petersfield. This made a total of 31 paying members and seven honorary members. He was very glad to see three new members elected that day. With regard to the financial side of the report, he regretted to say his balance sheet had to show a deficit on the year of £1 4s. 6d. This was not due to increased running expenses, but to the fact that they were rather more generous in donations than they could afford, and also that there were more outstanding subscriptions this year than last. The sum on deposit account amounted to £44 4s. 10d. Before closing his report he wished to offer his thanks to the President for his very great help at all times, and also to say how very grateful they were to the essayists, who had come down and given them papers. These papers entailed a great deal of work, and he thought it was very good of these gentlemen to spare them a whole day to come and present their subjects to such a very sparse attendance, as was so often the case.

Finance.—Continuing, Mr. White said that when he took over the Secretaryship he found that the balance sheet was brought out in March; that was really contrary to their rules, which stated that the balance sheet should be from January to December. The position was that they were using the current year's subscriptions to pay last year's debts, as it were, and consequently they were always having an overdraft the charges on which during the past year had amounted to 11s. 10d. for an average overdraft of anything from £7 to £8. On the other side, the interest on their deposit account amounted to 13s. 10d. for a deposit account of about £48. He would much prefer —and he thought any Treasurer and Honorary Secretary would find it much easier—that the accounts should be balanced on January 1st. The difficulty was that if they tried to do this it would be necessary to take a certain sum from their deposit account. He proposed that in order to put the financial affairs of the Society upon a more rational footing and to stabilise the financial year from January to December, the Honorary Treasurer be permitted to transfer from the deposit account the sum of £12 and further that in future greater economy be exercised in the donations given by the Society.

Mr. Caldwell thought they ought to support the suggestion made by their Secretary and Treasurer for putting the finances of the Society on a proper footing and he proposed that they adopt the report with his suggestion and that they at the same time record their thanks to Mr. White for his valuable services as Hon. Secretary.

Mr. H. C. Rockett seconded this proposal, which was at once agreed to.

Donations.—The meeting then discussed the

donations to be made for the coming year and it was decided to vote one guinea to the National Horse Association, two guineas to the R.C.V.S. Library Endowment Fund, and three guineas to the Victoria Veterinary Benevolent Fund.

ELECTION OF OFFICERS

The election of officers was the next business on the agenda and the Honorary Secretary announced that Mr. Tutt, their President, found it very difficult to carry on, but he personally thought it would be a great pity if Mr. Tutt relinquished the office. Mr. Tutt was as good a man as they could possibly get and he would like to ask him to reconsider his decision. "I think we will all admit," said Mr. White, "that our President has push and that is what we want; he has also been most successful in getting us some good essayists."

There were several seconders to this and Mr. Tutt announced, amid applause, that he was quite prepared to assist the Society as long as he could.

Vice-Presidents.—Mr. F. Beckett and Mr. J. Stewart Wood were elected as the two Vice-Presidents, Mr. E. R. Harding having expressed a wish to retire.

Hon. Secretary and Treasurer.—With reference to the joint position of Honorary Secretary and Treasurer, Mr. WHITE said he wished to retire from the former position and he thought he had secured a very suitable successor in Mr. Caldwell. If there was no other name he was willing to carry on as Honorary Treasurer but he would like to propose Mr. H. S. Caldwell as Honorary Secretary and he thought they would find he would make an excellent one. (Applause.)

Mr. ROCKETT seconded, and the proposition was carried unanimously.

Mr. CALDWELL, in reply, said he would do his best to fill the position of Hon. Secretary to their satisfaction, adding that he thought their best thanks were due to Mr. White for the work he had done during a number of years.

Council.—Captain Bullen, Mr. G. N. Gould, jun., and Mr. G. Warnock Begg were elected as the other members of the Council.

Paper.—This concluded the routine business of the meeting and the President called upon Mr. G. WARNOCK BEGG to contribute a paper he had prepared on "Grass Disease in Horses," Mr. Begg's contribution was heard with much appreciation and promoted an interesting discussion. [The paper is reproduced, together with a report of the discussion, at the commencement of this issue.—*Editor.*]

The PRESIDENT proposed a hearty vote of thanks to Mr. Begg for his interesting and instructive paper, to Colonel Holness for opening the discussion and to Major Bamford, Major Sparling and the other speakers who had contributed to it.

Mr. J. STEWART WOOD seconded and the vote was carried with acclamation.

Tea was afterward taken, when the discussion was resumed in an informal way.

Next Meeting.—The next meeting will be at the Station Veterinary Hospital, Tidworth, on June 19th, by kind permission of G.O.C. Southern Command, O.C. Troops, Tidworth, and Colonel Holness, when Major Townsend, O.B.E., M.C., F.R.C.V.S., R.A.V.C., will give a demonstration on the standing operation for roaring. Types of Army horses will also be shown.

H. S. CALDWELL, *Hon. Secretary.*

In Parliament

The following questions and answers have been recorded in the House of Commons recently:

DOGS (IMPORT REGULATIONS)

Sir R. GOWER asked the Minister of Agriculture how many performing dogs during the past twelve months have, on entry into this country, been exempted from the provisions which require them to be kept in quarantine for a period of six months; what conditions were imposed on their owners on the dogs being so exempted; and, particularly, if any required provision had to be made for their care and welfare whilst in this country?

Mr. ELLIOT: Performing dogs are permitted by licence to land in this country subject to quarantine for six calendar months either on approved veterinary premises or on the premises at which they are to perform. Movement from place to place is authorised under prescribed conditions by the endorsement of the licence after inspection of the premises as to their suitability for the isolation of the dogs. Reasonable facilities at the place of detention for the exercise of the dogs are required before movement is authorised. During the past twelve months 61 dogs, the property of 13 owners, were imported under these conditions.

Sir R. GOWER asked the Minister of Agriculture whether, during the past twelve months, any dogs, other than performing dogs, have been exempted from the provisions that a dog shall be kept in quarantine at the premises of a qualified veterinary surgeon for six months after landing in this country; and to what owners and upon what grounds has such exemption been granted and subject to what conditions?

Mr. ELLIOT: Exemption from the normal import regulations in respect of dogs other than performing dogs was granted in the past year in the case of only one dog which, in order to enable research work begun in the United States to be continued in this country, was allowed to be quarantined at the Royal Maternity and Women's Hospital, Glasgow. The conditions governing the quarantine were, however, similar to those in operation in the case of a dog quarantined on approved veterinary premises.

The Royal Dublin Society's Spring Show beat not only its own record for attendance but also the record for attendance at the more popular horse show. The Saturday attendance—36,864, compared with 26,444 last year—was the largest in the history of the Society. The total attendance for the five days of the show was 109,774.

Notes and News

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events

May 25th.—Meeting of the Editorial Committee, N.V.M.A., at 2, Verulam Buildings, Gray's Inn, W.C.1, 4 p.m.

May 27th.—Annual Meeting of the Section of Comparative Medicine, Royal Society of Medicine at the Society's House, 1, Wimpole St., W., 5 p.m.

May 28th.—R.C.V.S. Council Election Voting Papers due.

May 28th.—General Meeting of the Lancashire Division, N.V.M.A., at Manchester, 2.30 p.m.

June 3rd.—N.V.M.A. Committee Meetings at the Royal (Dick) Veterinary College, Edinburgh.

June 4th.—N.V.M.A. Council and Committee Meetings, at the Royal (Dick) Veterinary College, Edinburgh.

June 4th.—Visit of the Central Veterinary Society to the Museum of the Wellcome Research Institute, 183-193, Euston Road, N.W. Business meeting at the same address.

June 4th.—R.C.V.S. Annual Meeting and Luncheon in Edinburgh.

June 11th.—D.V.S.M. Examination begins.

June 11th.—Meeting of the Lincolnshire and District Division, N.V.M.A., at Peterborough, 2.30 p.m.

June 12th.—R.A.V.C. Annual Dinner, Grosvenor House, W.1., at 8 p.m.

June 24th.—R.C.V.S. Committee Meetings.

June 24th.—Victoria Veterinary Benevolent Fund Council Meeting.

June 25th.—R.C.V.S. Committee Meetings.

June 26th.—R.C.V.S. Committee and Council Meetings.

June 29th.—R.C.V.S. Membership Examinations begin.

July 2nd.—R.C.V.S. Oral and Practical Examinations begin in London.

August 22nd.—Entries for Jubilee Memorial Bursary Examination.

Sept. 14th-18th.—N.V.M.A. Annual Congress, Scarborough.

Sept. 22nd, 23rd.—Jubilee Memorial Bursary Examination.

PERSONAL

Dr. Bradley's 25 Years as Principal of the "Dick" College

FORTHCOMING PRESENTATION

It is the privilege of our small profession to have in membership a number of men whose names are "household words" even beyond our borders. One of the most eminent of these is Dr. O. Charnock Bradley, whose untiring and—particularly on ceremonial occasions—scholarly efforts on behalf of the N.V.M.A. vie with his claims as a veterinary scientist and teacher in support of the request made of us by the committee concerned—and most gladly acceded to—that we should give publicity to the following statement and appeal.

PRESENTATION TO PRINCIPAL O. CHARNOCK BRADLEY

At the close of the present session, Principal O. Charnock Bradley, M.D., D.SC., F.R.C.V.S., F.R.S.E., will have completed 25 years as Principal of the Royal (Dick) Veterinary College. His services to the veterinary profession and to science have been eminent and far reaching and it is felt that the occasion should not be permitted to pass without suitable recognition.

Appointed to the College as Lecturer in Anatomy in 1900, Dr. Bradley quickly made his influence felt and eleven years later was appointed Principal. Under his able direction the College has made remarkable progress. The dignified building in which it is now housed owes its existence primarily to his efforts and though what at the time appeared to be ample accommodation for teaching and research was provided, there has been such steady expansion in the number of students in attendance that already there is need for extension. At the same time, there has been a notable advance in the standard of teaching, research has been developed and important public advisory services have been initiated. It may be added that Dr. Bradley's personal qualities—his broad, human sympathy, his wide culture and his obvious devotion to the College—have been a source of inspiration alike to staff and students, who hold him in affectionate esteem.

As a member of council since 1911 of the Royal College of Veterinary Surgeons, the licensing and disciplinary body of the profession—of which for two years he was President—Dr. Bradley has done much to raise the whole status of the veterinary profession. On two occasions he has occupied the Presidential Chair of the National Veterinary Medical Association, which owes much of its present influential position to his efforts.

In the domain of science he has played a noteworthy part. He is at present, Lecturer in Comparative Anatomy in the University of Edinburgh, in which subject he has gained for himself an international reputation. He is a Vice-President of the Royal Society of Edinburgh, a past President and past Secretary of the Royal Physical Society and a Member of Council of, and has acted as Honorary Prosector to, the Zoological Society of Scotland since its inception.

A representative committee has been formed to consider how Principal Bradley's Jubilee may be most fittingly recognised, and it has been decided that the most suitable method of commemorating the occasion will be to present him with his portrait in oils and to establish a lectureship to be called "The Charnock Bradley Lectureship."

For these purposes the committee is now issuing this appeal for funds, to which they are convinced there will be a liberal response, not only by those who have been directly associated with the College during Dr. Bradley's Principalship, but by many others.

Subscriptions should be sent to A. C. Doull, Esq., C.A., the College Secretary, who has agreed to act as Treasurer to the fund. Cheques should be crossed "The Bradley Presentation Fund."

For and on behalf of the Committee.

T. Hudson Beare, *Chairman.*

A. C. Doull, *Secretary.*

Royal (Dick) Veterinary College,
Edinburgh, 9.
May, 1936.

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Birth.—On May 13th at "The Cottage," Ashton, nr. Chester, to Mr and Mrs. C. A. Stewart (qualified Miss J. K. Dowlen), a son, John Macpherson.

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Sir Frederick Hobday Honoured.—We have pleasure in announcing that, at the meeting of the Académie Vétérinaire de France at which, as we informed our readers last week, Professor Buxton was elected a Foreign Corresponding Member of the Academy, a similar distinction was conferred upon Sir Frederick Hobday, C.M.G., F.R.C.V.S., Principal of the Royal Veterinary College, London.

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Veterinarian's Son Elected F.R.C.S.—It is with much interest that we note that Professor C. B. Perry, M.D. (son of Mr. C. E. Perry, F.R.C.V.S., of Bristol) who was appointed to the Chair of Medicine in the University of Bristol in 1934, has been elected a Fellow of the Royal College of Physicians.

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R.C.V.S. OBITUARY

Gentle, Alexander Henderson, 21, Locko Road, Spondon, Derby. Graduated Edinburgh, April 15th, 1880; died May 11th, 1936, aged 85 years.

ULSTER MINISTER OF AGRICULTURE AND THE SPAHLINGER VACCINE

Sir Basil Brooke, Minister of Agriculture for Northern Ireland, moving the Ministry's estimates in the Ulster House of Commons on May 7th, referring to experiments which were being carried out with the Spahlinger anti-tuberculosis vaccine, said that the results showed that it conferred a very high degree of immunity against a lethal dose of tubercle injected into the blood stream, and at least an equally high degree of immunity against intense natural infection during a period of approximately two years. Such highly satisfactory results raised the question of the compulsory use of the vaccine as a means of eradicating bovine tuberculosis from Ulster herds. As a first step towards that object it was desirable to clear up two points. First, whether the application of the tuberculin test to an animal which had been vaccinated interfered in any way with the immunity conferred by Mr. Spahlinger's dead vaccine; and, secondly, how long the immunity conferred by the vaccine could resist intense natural infection. The first of those experiments had already started, and the second, in which a large number of animals would be required, would start as soon as Mr. Spahlinger could provide a further supply of vaccine. Their veterinary research officers had been completely successful in growing the tubercle organism in accordance with the method published by Mr. Spahlinger. He mentioned that matter because doubt had been cast by prominent people on the possibility of doing so owing to lack of success in two laboratories in England.

Anti-Abortion Vaccine

Continuing, the Minister made reference to an experiment with a dead anti-abortion vaccine which had been prepared by the Ministry's Veterinary Research Officers, observing that contagious abortion was responsible for the greater part of the losses occurring in their dairy herds. The estimated losses in the United Kingdom due to that scourge amounted to at least £5,000,000 per annum, and there was at present no certain remedy. The research officers had prepared a dead vaccine, and for some time past had been carrying out experiments with it on small animals with very satisfactory results. It was essential, if they were to proceed further, to carry out an experiment with cattle. The Ministry had, therefore, rented an appropriate area of grazing land on which two groups of animals, one vaccinated and the other not, would be exposed to infection. He was most anxious that there should be no undue optimism, and, therefore, he desired to emphasise that the Ministry would not have, until that experiment was complete, direct evidence as to the value of the abortion vaccine prepared by the Veterinary Research Officers.

Clean Milk

In his speech the Minister also dealt with the development of the milk industry, stating that the improvement in the cleanliness of the supply had eliminated a great deal of waste and had been an important factor in keeping down costs. The remarkable change that had taken place in the cleanliness of milk was best indicated by the fact that 11 per cent. of the liquid supply was Grade A, 56 per cent. Grade B, and 33 per cent. Grade C. The Ulster Grade B standard was the same as that until recently known as Grade A in England.

R.S.P.C.A. ANNUAL MEETING

At the annual meeting of the Royal Society for the Prevention of Cruelty to Animals, held in Kingsway Hall, London, recently, it was announced that the King had consented to become principal patron in succession to King George, who held the office for many years. Sir Robert Gower, chairman of the Society, presided, and the Norwegian Minister, Hr. Erik Andreas Colban, and Sir Cooper Rawson, M.P., were among the speakers.

The Chairman said that in their work during the past twelve months in almost every direction they were able to show a very marked development. The public was making more and more use of their inspectors, and during last year no fewer than 31,425 complaints of cruelty were investigated, representing an increase over the year before of nearly 2,000 complaints. The number last year was, so far as he knew, a record.

It was sometimes alleged that there were no really bad cases of cruelty to animals in these days. That was quite wrong. In spite of the undoubted improvement in the treatment of animals and birds in this country, there still occurred cases of revolting and brutal cruelty.

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The Halifax Clinic

In her report to the annual meeting of the Halifax Dispensary, the Secretary, Mrs. Alfred Eastwood, stated that the clinic had made great progress and it was rendering invaluable service to the cause of local animals. During the year, treatment had been given to 880 animals and 74 had been destroyed. The clinic had been open 90 times and the average cases per night were 19, while the average donation was 5d. per case. The work accomplished reflected the greatest credit on the veterinary surgeon, Mr. Edward Ackroyd, M.R.C.V.S., and his helpers.

Mrs. Eastwood added that the clinic was only available for the animals of people who were unable to pay for professional attendance, but people obviously able to pay a veterinary surgeon had been attending. She reminded these people that this was unfair to the veterinary surgeons. It was an expensive service, and more funds were needed to put it on a sound financial footing. It had, however, been inspected and approved by headquarters officials, who had awarded the local branch a certificate of merit.

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LEGAL NOTES

Sheep Neglect at Ken Wood.—At Marylebone Police Court on Friday of last week, George Dale Williams, sheep farmer, of Beaumont, Great Central Avenue, Ruislip, Middlesex, was fined £25, and ordered to pay 30 guineas costs, on a summons by the R.S.P.C.A., for causing unnecessary suffering to sheep in Ken Wood in February last by unreasonably omitting to give them proper care and attention when in a suffering state.

Mr. Gordon Jones, counsel prosecuting for the R.S.P.C.A., said that the allegation was that sheep suffering from foot rot or kindred disease were kept on low-lying ground which was damp and unsuitable; and that they should have had more efficient attention and more adequate provision for food.

Mr. Frank G. Baxter, veterinary surgeon, said he examined three of the sheep on February 11th. One was in very poor condition, extremely lame, and in great pain. A second was greatly emaciated and very lame on the near foreleg, while the third was in such a condition that it could hardly stand and he advised its destruction because he thought it was cruel to keep it alive. Out of 150 sheep 20 were in his opinion as bad as the first two he examined. The sheep showed no sign of having been treated for two or three weeks. On February 14th he and another veterinary surgeon, Mr. Walpole, examined 24 lambs and found two dead and two in such a condition that he advised their destruction.

Mr. Williams denied the allegations and said he treated the animals under veterinary direction. The land was suitable and the food adequate. He was supported by veterinary evidence.

The magistrate (Mr. McKenna) said he thought that the defendant should have been given notice by the R.S.P.C.A. when their veterinary surgeons intended to examine the sheep.

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LIVESTOCK FERTILISING FLUID: AIR TRANSPORTATON EXPERIMENT

The following announcement is made by the Cambridge University School of Agriculture:—

A little over five months ago a small amount of male fertilising fluid from a ram of the Suffolk breed belonging to the Animal Nutrition Research Institute, School of Agriculture, Cambridge University, was collected by Dr. Arthur Walton, packed (surrounded by ice) in a vacuum flask, and sent by air mail to Professor Prawochenski at the Zootechnical Institute at Borowina, Poland. The distance is about 1,500 miles, and the time taken for the journey—from laboratory to laboratory—was two days and three hours. By Professor Prawochenski the fluid was introduced into ewes of a Polish breed of sheep.

News has reached Cambridge that a ram lamb (one half Suffolk and one half Polish) has been born. Appropriately enough it has been called "The Airman." Its paternity is not in doubt; the impregnation of its mother was carefully supervised, and its appearance at birth shows many Suffolk characters—quite unlike the appearance of the lamb of the Polish breed.

The experiment, it is pointed out, demonstrates the widening possibilities for the future of using valuable sires to improve the quality of farm livestock. Problems still to be solved include that of keeping the fluid in such a condition that it may be fertile after a lapse of time that will allow it to be transported reasonable distances.

At the Animal Research Station at Cambridge a calf has been born from fluid kept under controlled conditions for three days and a lamb from fluid four days old. With the speeding-up of aerial transport—New York can be reached from Europe in 61 hours—the development in this sphere may be rapid. Transport of fluid has already been carried out on a practical scale in Russia, but the Cambridge-Poland experiment is the first time that an exchange between countries has been effected.

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IMPROVEMENT OF CATTLE IN INDIA: THE VICEROY'S POLICY

Arrangements have been completed for putting into operation in Delhi Province the plan for improving cattle in India which was initiated by the Viceroy, Lord Linlithgow, when he presented three Hariana bulls for the improvement of stock in the villages around Delhi.

The project is being undertaken by the animal husbandry expert of the Imperial Council of Agricultural Research in collaboration with the Director of Veterinary Service in the Punjab. The aims of the Viceroy in presenting the bulls were to give direct assistance to cultivators of Delhi Province and to encourage the adoption

of similar measures in other parts of India for the systematic improvement of livestock of all kinds by means of organised breeding control.

"The Viceroy's personal concern for the welfare of the villager has struck a new note in Indian administration and politics," says the Simla correspondent of the *Times*, in transmitting the above information. "His act in presenting the bulls and his recent visits to villages near Dehra Dun have caught the imagination of Indians, who recognise that, in fostering any project designed to improve the lot of the agriculturist, the Viceroy is touching a fundamental factor in Indian life and policy. The *National Call*, a Congress newspaper published in Delhi, while pointing out some of the political implications underlying the policy of the Viceroy, also remarks that 'this viceregal concern for the cultivators is, in our opinion, a potent force released among the agriculturists from which we expect nothing but good.' It is widely recognised that Lord Linlithgow is acting as an expert agriculturist conscious of the difficulties besetting the cultivator and anxious to help the villagers in field and home.

"Lord Linlithgow anticipates that wealthy *zamindars* (landholders) and others will follow his example by presenting and maintaining approved bulls for the systematic improvement of cattle in their villages. A group of Indian journalists have opened a fund for the provision of bulls. In addition, it is considered possible that suitably organised provincial animal husbandry departments will be able to confer great benefit on the *ryots* of India at relatively small expense, provided that they have at their disposal adequate numbers of trained subordinates.

"The bulls presented by the Viceroy have been attached to established institutions at Delhi, and their services will be free, but will be restricted to selected cows of good Hariana type. The selected cows and their progeny will be registered and tattooed, and the District Board will have the right to purchase any entire male they may require for breeding purposes within the Delhi district at a minimum price of Rs. 100 (approximately £7 10s.) at two years of age. It is recognised by the authorities that a most important feature of livestock improvement measures is accurate registration of the services and progeny of improved sires, so that in course of time pedigree stock may become available all over the country.

"Lord Linlithgow was particular that the bulls he purchased, and proposes to maintain at his own expense, should be of high class and known pedigree and permanently protected from rinderpest. In this connection he was interested to learn that lasting immunity against rinderpest can now very easily be conferred on indigenous Indian cattle by a vaccine obtained from goats which is cheap, effective, and free from danger. Researches carried out for some years at the Imperial Institute of Veterinary Research at Muktesar have proved this, and the use of the vaccine has become the routine practice in all Government farms and by Provincial and State Veterinary Departments all over India.

"Breeding in India is largely concerned with the production of 'work cattle' side by side with the production of 'milk cattle.' For India as a whole, where from time immemorial cattle have almost exclusively been bred for speed and working capacity, the right policy appears to be to breed for work in the natural grazing areas where the development of a dairy industry on modern lines would not be feasible, and to breed strictly for the highest possible milk yields in special herds and in regions suitable to the development of the dairy industry. This is being done on most Government farms, though in some cases with the avowed intention of breeding a dual purpose (work and milk) animal. There is likely to be a constant drag on the progress of good types unless definite milking and working types are bred for separately, in order that breeders can quickly achieve and maintain steady progress in one or other direction."

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DAIRY FARMING PROSPERITY IN THE NORTH

"The cow is helping the North back to prosperity," writes Mr. Eric Hardy, F.Z.S., in a recent issue of the *Daily Mirror*. "Dairy farming is propering more than the cotton industry in Lancashire now, and the county of the Red Rose is earning itself the reputation of the fourth largest cattle rearing county.

"Its herds are exceeded in size by those of Somerset, Yorkshire and Devon. Especially are they increasing around the big towns, where the demand for milk increases, but the farmers of Lancashire and Yorkshire have little time to rear their own calves, and most of their stock is bought from the Cumberland and Westmorland hill farms.

"Never in the history of farming have there been so many cows in the north as there are now. Three-quarters of these herds are of Shorthorn (or Tees Valley) breed; quite a number are Herefords.

"One of the finest herds of British Friesian cattle in the country is kept at Lathom Park, near Ormskirk; one of Britain's best herds of dairy Shorthorns is the Duke of Westminster's at Aldford, near Chester. Lancashire has nearly 250,000 head of cattle, and the number of cows has recently increased by more than 4,000. Cheshire has more than 200,000 cattle, with an increase of more than 1,000 cows recently. Yorkshire has more than 600,000 head of cattle, nearly 300,000 being in the West Riding, 211,000 in the North Riding and 108,000 in the East Riding. Northumberland farmers, who have increased their dairy herds by more than 2,000 cows recently, have about 180,000 cattle, and Durham farmers more than 100,000. In Staffordshire there are more than 200,000 head of cattle, in Salop 240,000, in Nottinghamshire 100,000. There are, in fact, more than 2,000,000 head of cattle in the north.

"It is the milk industry, not the beef or the hide trade, that has necessitated this increase in herds."

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REPEATED ABORTION

In our issue of April 18th, (p. 505), we published an abstract of an article by the French author, R. Moussu, in which he claims success in the prevention of contagious abortion in cattle by injection of vitamin E. We now reproduce below a *Lancet* annotation as contributing further information on this subject.

"During the luteal phase of the ovarian cycle the uterine muscle loses its spontaneous contractility and becomes relatively insensitive to posterior pituitary extracts. From this it is deduced that the corpus luteum maintains the uterine quiescence that is essential for retention of the developing embryo during early pregnancy. Assuming that habitual and threatened abortion sometimes results from undue uterine motility various workers[1] have

[1] Wolfsohn, H. Med. Welt. (1932.) vi. 1616. Weinzierl, E. Med. Klin. (1933.) xxix. 563. Bishop, P. M. F., Cook, F., and Hampson, A. C. *The Lancet*. (1935.) i. 139.

advocated the prophylactic or therapeutic use of the corpus luteum hormone progestin in such cases. Finding that one rabbit unit of progestin can inhibit human uterine contractions on the seventh day post partum, Falls, Lackner, and Krohn[2] have been giving one rabbit unit twice daily in cases of threatened abortion until the symptoms subsided or the patient aborted, and a similar dose twice weekly from the time of diagnosis of pregnancy until the thirty-second week in cases of habitual abortion. In a series of 41 cases they report only seven failures, and these results are in general agreement with those of other workers, though there is elsewhere a tendency to give more frequent doses, in the habitual abortion group, during the early months of pregnancy when this type of abortion is commonest.

"Despite the success claimed for this treatment, however, there may well be other factors—excluding such organic causes as syphilis—responsible for habitual abortion; and of these a deficiency of vitamin E is possibly the most important. Attention was first drawn to this stable, fat-soluble vitamin, present in high concentration in wheat-germ oil, by H. M. Evans and K. S. Bishop in 1922. Lack of this factor in the diet of male rats results in irreparable degeneration of the germinal epithelium of the testis; in pregnant females it leads to death of the foetus; and though in non-pregnant females no degenerative changes have been found in the ovaries such animals are said to suffer from a transient, relative sterility."

[2]Falls, F. H., Lackner, J. E., and Krohn, L. *J. Amer. Med. Assoc.* Jan. 25th, 1936. p. 271.

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EFFECT OF OESTROGENIC HORMONES ON LACTATION IN THE COW

Folley, S. J., of the National Institute for Research in Dairying, in a communication published in *Nature* of May 2nd, states that there is evidence[1] that administration of oestrogenic hormones to lactating animals causes inhibition of milk secretion and adds: "In the case of the work cited, largely owing to the difficulty of making accurate measurements of milk secretion rate and of changes in milk composition in experiments on small animals, the evidence that inhibition occurs is not so conclusive as might be desired, nor have accompanying changes in milk composition been studied. The above difficulties are obviated by use of the lactating cow as experimental animal."

In the course of studies of the hormonal control of lactation now in progress at the Institute, the effect of the administration of massive doses of oestrogenic hormones to the lactating cow has been investigated. A lactating Guernsey cow was given, by intramuscular injections spread over three days, a total of 500 mgm. oestrone, and 50 mgm. oestradiol benzoate. Injection into a control cow of equal amounts of the oil in which the hormones were dissolved showed this to be without effect on lactation. While oestrogenic hormone caused a marked diminution in the daily milk yield (an inhibition of approximately 20 per cent.) the non-fatty solids content of the milk was raised by more than ten per cent. "This finding, taken in conjunction with the fact that thyroxine administration leads to an increase in milk non-fatty solids content,[2] gives reason to hope that in the near future the factors controlling the level of non-fatty solids in milk will be further elucidated, and a method of treatment based on physiological principles, applicable to cows secreting milk poor in non-fatty solids, may be evolved.

"The results of this experiment confirm the suggestion from previous work[3] that the secretion of milk fat is a process not very closely related to the secretion of other milk solids, since in the dose given, oestrogenic hormone had little effect on the fat content of the milk. The percentage drop in the total daily secretion of milk fat caused by the experimental treatment was therefore far greater than the percentage fall in the daily secretion of non-fatty solids. A point of further interest, in view of the inverse relationship known to exist throughout lactation[4] between milk yield and milk phosphatase concentration, is the striking increase in the latter quantity following oestrogenic hormone administration."

The writer concludes by stating that these experiments, which are being extended, will be reported in detail elsewhere.

[1]Parkes and Bellerby. (1926-27.) *J. Physiol.* **62.** 301; Robson. (1934-35.) *Quart. J. Exp. Physiol.* **24.** 337; Smith and Smith. (1933.) *Amer. J. Physiol.* **103.** 356; Nelson. (1934.) *Endocrinology.* **18.** 33.

[2]Folley and White. *Proc. Roy. Soc.*, B, 9136 (in the press).

[3]Graham, J. (1934.) *Nutrition.* **7.** 407.

[4]Folley and Kay. Biochem. Soc., March 13th, 1936 (*J. Soc. Chem. Ind.*, **55**, 234; 1936).

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MODERN VIEWS ON EVOLUTION

In an annotation devoted to the above subject, the *Lancet* (**230**, 5874) observes that there are many grades of opinion among biologists on the question of the mechanism of evolution, ranging from that of the neo-Lamarckians whose faith in the inheritance of acquired characters remains unshaken in spite of the paucity of evidence in its favour, to that of the gene mutationists whose theory has been erected upon an imposing mass of experimental evidence from genetics and cytology. "Professor Walker attempts,[1] in a recent publication, to reconcile conflicting points of view and facts which have hitherto been difficult to fit into a single theory. After disposing of the Lamarckian theories he ranges himself on the side of the selectionists, but denies the wide application of the chromosome theory of heredity. The most important characters of organisms, he says, are not inherited alternatively and are therefore not borne on the chromosomes, which are responsible for the transmission of relatively insignificant features. The major characteristics must be represented in some other part of the cell. The original suggestion is made that changes may originate in the chromosomes and later be impressed upon the rest of the cell. 'Mendelian' characters are thus the recently acquired ones, while older and more basic characters are those which show 'blending inheritance.' Professor Walker is justifiably sceptical of the Mendelian explanation of blending inheritance by the postulation of a large number of factors, a procedure which could explain almost anything. He is not, however, always just to the opposing view, and has ignored recent work which tends to show that many 'Mendelian' characters are only outward signs of more important physiological characteristics, that the action of a gene is by no means fixed but depends upon the nature of the rest of the 'gene complex,' and that the chromosome theory of sex determination can be reconciled (at least theoretically) with the occurrence of the sex reversal. Many of the difficulties in accepting the complete chromosome theory, particularly those derived from a study of the protozoa, are well stated in this monograph, which is, however, too discursive for easy reading.

[1]Evolution and Heredity. By Charles Edward Walker, D.Sc., M.R.C.S., Associate Professor of Cytology in the University of Liverpool. London: A. and C. Black, Ltd. (1936.) Pp. 222. 6s.

"Dr. Hurst makes a contribution of a different kind. His book[2] is written in a lucid style and is so well planned that no one can fail to follow the arguments. The gene and mutation theories are clearly presented with no mention of any facts which might lead to confusion or to doubt that the theories as at present conceived may apply to all aspects of heredity and evolution. The origin of life in 'progenes' is discussed in a manner which almost gives the impression that the matter has already been proved whatever may be meant by the term 'progene.' That naturally occurring short-wave radiations give rise to mutations which are the basis of evolutionary change is suggested and later assumed in spite of much contrary evidence. This is a readable and entertaining book, but which might, however, mislead the ordinary reader by giving an impression that the basis of the mechanism of evolution is thoroughly understood, and that it is now only a matter of working out the details. Few biologists would claim such finality for the theories of to-day."

[2]Heredity and the Ascent of Man. By C. C. Hurst, PH.D., SC.D., sometime Fellow Commoner and Research Student of Trinity College, Cambridge. London: Cambridge University Press. (1935.) Pp. 138. 3s. 6d.

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INDUCTION OF MAMMARY DUCTS

Deakin, A. (*Nature*, **137**, 3467), of the Central Experimental Farm, Ottawa, after pointing out that the mammary gland of the pig has normally two primary ducts which open separately on the surface of the nipple, states that embryologically, the two ducts proliferate from the base of a cone-shaped depression of the stratum germinativum known as the mammary pocket or mammary bud. A similar depression or epithelial ingrowth, variable in depth, surrounds the nipple at its juncture with the body wall. Among several foetal glands sectioned, a few cases of aberrant ducts, similar histologically to the primary ducts, were noticed to have sprouted from the same relative position to the apex of the epithelial ingrowth at the base of the nipple as the primary ducts do to the apex of the mammary pocket. (A figure is given in illustration.)

"These aberrant ducts," he proceeds, "would appear to furnish evidence that an inducing stimulus is responsible for the development of the primary ducts, similar in principle to Spemann's demonstration of the underlying mesoderm providing an inducing stimulus for neural plate development in Urodela. Recently, Waddington suggested that some, if not all, inductions are due to the diffusion of active chemical substances into the reacting tissues. It would appear reasonable therefore to infer that an active substance is present in the nipple which stimulates duct development in specific locations relative to apices of epithelial ingrowths. Furthermore, that the stimulus is specific for particular groups of animals. Thus in the horse, in common with the pig, there are normally two primary ducts which develop respectively from the anterior and posterior walls of the mammary pocket; ruminants have only one duct, which proliferates from the apex of the mammary pocket, and in man there are several primary ducts.

"Phylogenetically, Darwin considered the mammary glands to have developed in response to an intimate relationship existing between mother and offspring as occurs in the lower mammals. Histologically, they have been regarded as both modified sweat and sebaceous glands. Bresslau regards the increased secretory activity of skin glands on particular spots of the abdomen in the lower mammals as due to the presence of highly vascular gland areas. He considers the gland areas to be phylogenetically older than the Mammalia, since they are found on the ventral surface of some birds—the so-called brooding spots. In the higher mammals the mammary glands from their inception are specialised structures the ducts of which, as previously mentioned, appear to owe their inception to an inducing substance; the occasional absence of this substance may be the cause of blind teats sometimes found.

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SOME FEATURES OF MALIGNANCY

On April 17th, in the week of the 109th anniversary of Lister's birth, the Lister Memorial Lecture was delivered at the Royal College of Surgeons of England by Sir Robert Muir, professor of pathology, University of Glasgow, this year's recipient of the Lister medal, which is awarded triennially by the College. Sir Robert Muir chose for his subject "Malignancy, with Illustrations from the Pathology of the Mamma," and we reproduce the *British Medical Journal* summary of the lecture. "Sir Robert began with a reference to the breaking of precedent which admitted to the high honour of the Lister award one who was not himself a surgeon. He came before them, he said, as a 'layman,' with a layman's disabilities, but he knew that the desire of those who made the award was to emphasise that pathology and bacteriology were the essential basis of Lister's work in surgery. He referred in some detail to the scientific achievements of the earlier part of Lister's life before his epoch-making contributions to surgery were forthcoming. By the time he reached Glasgow, at the age of 33, Lister had published more than a dozen papers on histological, physiological, and pathological subjects, several of them being historical landmarks.

Character and Distribution of Malignancy

"Sir Robert Muir said that he proposed to speak on the present knowledge of the characters and aetiology of malignancy as the result of experiment, to give illustrations from his own observations on malignant disease of the mamma, and finally to consider the essential nature of malignancy. In a general way malignancy might be regarded as an abnormal behaviour of cells, consisting essentially in uncontrolled growth; but the proliferation must not be regarded as all-powerful. Experimental work on transplantation of tumours showed that the margin between growth and non-growth was comparatively narrow, and there were numerous examples in the human subject of malignant cells being overcome and disappearing locally. The actual malignancy was in fact the surplus malignancy against tissue resistance. On the other hand, there was no satisfactory evidence that weakened resistance of connective tissue would in itself lead to malignancy in the related epithelium. A malignant character once acquired seemed to be a permanent property of the cells; the cells might be destroyed or die out, but they did not, so far as was known, regain a normal behaviour. The biological properties of the cells appeared to undergo an essential alteration which was transmitted to their descendants.

"As for the distribution of malignancy in the human body, recent investigation had not only revealed the wonderful variations in the structure of tumours but also the multiplicity of cells from which they arose. It was justifiable to say that malignancy might appear in any cell

of the body if the cell had the power of normal proliferation. Tumours, malignant as well as simple, arose not only from the tissues most active in repair, but also, though less frequently, from specialised cells, such as those of the liver. On the other hand, adult nerve cells had lost the power of proliferation, and no tumour arose from them, though a growth might originate from their progenitors, the neuroblasts, often possessing highly malignant properties. Malignancy became more frequent as age increased, but malignant growths were met with in infancy, and there was clear evidence that they might originate during intrauterine life. Sarcomata of bone, too, were markedly related to the growth period.

Aetiological Factors

"Looking back on the last 25 years of research, Sir Robert Muir continued, one could not but be impressed by the advance in knowledge of the different ways in which tumours might be initiated. Chronic irritation was the first factor to be considered; then came the recognition, still from the clinical side, that a number of so-called irritants, strikingly different in their nature, were specially liable to cause malignant change. The matter was clinched by experimental work on carcinogenic agents, and the lecturer mentioned a number of researches by different investigators in this connection. He summarised the results which had been reached as follows:

1. By both experimental and observational methods it is shown that malignant growths may be produced by the prolonged action of irritants and cell stimulants. Such growths chiefly affect tissues active in repair.

2. There are malignant growths of the more specialised epithelial tissues and of some connective tissues which have not yet been produced experimentally, but pathological observations in the human subject indicate that they may arise on the same principles.

3. There are malignant growths which can be placed in neither of these two classes. We know nothing as to the conditions incidental to their occurrence, and can hardly even speculate as to their causation. Such are the malignant growths arising from embryonic cells, sometimes multipotent; those of the leucocyte-forming tissue; also a great variety of tumours in connection with the central nervous system, endocrine glands, etc. The methods of experimental embryology may throw light on some of these.

"As to whether there was any one general principle concerned in the initiation of malignant growth, he thought the nearest approach to a general statement which could be made was that the acquisition of malignancy was related to previous non-neoplastic proliferation. The occurrence of a long latent or silent period between the initial stimulus and the malignant growth was the rule, but there were exceptions, as in malignant growths appearing shortly after birth.

"The conditions which might lead to repeated or continuous cellular proliferation in pathological states were of three kinds:

(*a*) Chronic irritation. This term must be used in its widest sense. There were cases of carcinoma following long-continued reactive proliferation where nothing was known of the nature of the irritant. Carcinoma of the cervix uteri might be mentioned in illustration.

(*b*) A sequel to compensatory hyperplasia. The importance of this was that specialised cells proliferated. A noteworthy example was to be met with the liver. Probably no other organ responded so readily to loss of its substance by compensatory growth.

(*c*) A sequel to proliferation produced by hormones.

Malignancy in the Mamma

"This last point brought the lecturer to the new field of inquiry which had been opened up by the work done on malignant growths in the breast. The development of malignancy had been studied in breasts the seat of manifest cystic disease, in those with various conditions of local hyperplasia and fibrosis with little or no cyst formation, and also in those in which actual carcinoma was present. As a result of such study one became convinced that there were a whole series of structural changes, presenting infinite variety as regards detail, which affected the mammary epithelium and led up to malignancy. In the most general terms these were: (1) increased and altered secretion accompanied by changes in type of epithelium and by desquamation of cells, and (2) hyperplastic proliferation of the epithelium. The hyperplasia of the epithelium was attended for a long time by a co-ordinated increase of connective tissue—a condition still removed from malignancy. Thus there arose papillomatous growths in the ducts, and these were often present in an early stage in association with cystic dilatation. The next stage was a relative overgrowth of epithelium in comparison with stroma, epithelial outgrowths being produced containing only a small amount of connective tissue. This condition passed on gradually to a stage where there was proliferation of epithelium alone, and large cellular masses without any stroma were found in the ducts. Finally, the anaplasia became distinct; the cells and their nuclei varied in size, the latter becoming of the vesicular type with distinct nucleoli, the amount and arrangement of chromatin varied, and ultimately there appeared within the ducts cellular masses which had all the characters of an encephaloid carcinoma. The term "intraduct carcinoma" might then be applied, for the cells might be regarded as malignant although they had not yet passed into the tissue spaces.

"Intraduct carcinoma was often said to be rare; its occurrence as a widespread condition was certainly uncommon, but local intraduct carcinoma was, in the lecturer's experience, quite common. He believed that intraduct carcinoma, with or without a growth of malignant cells within the acini over a considerable area, represented a condition in which the cells had acquired the characters of malignancy, yet were still within normal bounds—"a sort of tissue culture of malignant cells still within the test tube." Ultimately, perhaps after years, the natural consequence was a break through the normal confines, with an ordinary infiltrating carcinoma as the result.

"Why did the cells not break through at once? Clearly there was a balance between tissue resistance and malignancy over a long period. It was not strange that intraduct carcinoma might exist for years before infiltration occurred when it was remembered that many years might also elapse before recurrence took place after operation. The struggle between malignant cells and normal tissues had often been observed and was of two main types. The presence of malignant cells within ducts might give rise to reaction of the connective tissue within the elastica, the tissue often undergoing a laminated thickening diminishing the lumen and gradually strangulating the cancer cells as it progressed. Again, there might occur a marked cellular reaction around the affected ducts and acini, the cells being chiefly plasma cells and

lymphocytes, and these at places might penetrate the walls of the ducts, causing the elastic tissue to disappear, and invading the cancer cells, so leading to their atrophy. But such processes of healing were, of course, effective only here and there, and the disease as a whole was progressive.

The Cancer Cell as a Parasite

"The parasite-like behaviour of the cancer cell was only a descriptive term, without reference to the ultimate nature of malignancy. The distribution of the malignant changes within the ducts depended in part on multiplicity of foci, and in part on the manner of spread, the latter including the intra-epithelial route. Briefly, once the cells had assumed malignant properties they might infiltrate the lining epithelium and grow within it, the malignant cells behaving like parasites and the epithelium playing a passive role. The epithelial cells invaded were in fact compressed by the malignant cells, though they might be recognisable for some time by their flattened and atrophied nuclei. Large oval malignant cells with characteristic nuclei might be seen growing here and there, or forming a continuous sheet of cells covered by a persisting layer of the original epithelium. The lecturer had traced this mode of epithelial growth at all stages and in all parts of the mammary tissue. He had seen it within acini, in the small and large ducts, in the ampullae and in the large ducts of the nipple. It was most often in this last situation, possibly because the epithelium there had a purely lining function to the pathways and presented more resistance to the spread. He had seen isolated malignant cells confined to the epithelium at the orifices of the ducts where the cells first arrived at the epidermis. Spread then occurred in the latter, producing the Paget lesion. The parasite-like behaviour of the malignant cell was brought out in a striking manner in these conditions and situations.

"The lecturer went on to discuss the relation between cystic disease and carcinoma. On studying histologically breasts in which cancer had already developed and searching for evidence of pre-cancerous changes, his experience had been that it was the rule to find epithelial hyperplasia on the basis of which malignancy had developed. The epithelial growth was often associated with cysts, but these might be of microscopic character or not recognisable as such during life. Malignancy might develop in connection with large cysts, but epithelial hyperplasia was the all-important factor, and although cysts and hyperplasia might coexist sometimes in striking fashion, he thought the two types of lesion were often in inverse proportion to one another.

"To interpret such changes as the usual precursor of malignancy agreed with what was known of malignant disease elsewhere, and especially with the results of experimental work on carcinogenesis. In the complete absence of evidence that the changes were of inflammatory nature produced by some outside agency, it was natural to regard them as the result of endocrine disturbance, and the lecturer went on to refer briefly to what had been established in this connection, mentioning the researches of a number of workers on the effect of oestrone in producing essential changes in the mammary tissue of mice, proliferation being followed by malignancy. It did not follow from such experiments that the changes in the human breast were the result of oestrone in excess. It was known that lutein also was concerned in the mammary changes associated with menstruation and pregnancy. Nevertheless, the observed facts gave strong support to the view that cystic hyperplasia was the result of disordered endocrine balance of a very delicate kind.

Essential Nature of Malignancy

"Many theories had been put forward as to the essential nature or cause of malignancy. The two main theories were: (1) that malignancy was the result of a change in the mechanism of the cell and (2) that it was produced by the presence of a virus. The change in the cell appeared to be two-fold: an escape from the normal growth-controlling agencies of the body, and the appearance of altered characters of the cells which gave the tumour its special structural characters. The parasitic theory had passed through many phases. Various organisms had been suggested—protozoa, bacteria, yeast—but it was now generally recognised that if a parasite was concerned it could only be an invisible micro-organism such as a virus. Here the lecturer recalled the work on fowl sarcoma which was found by Peyton Rous to be transferable by a cell-free filtrate, and the theory put forward by Gye as to the dual nature of the filtrable agent. If the filtrable agent was a virus, the question arose: Was there one or were there many? If a single virus were supposed, one great difficulty presented itself owing to the fact that the virus produced in the new tumour the features of the tumour from which it came. That a virus should, as it were, carry with it the characters of its environment in the original growth to a normal tissue was a phenomenon of which he knew no parallel. If, on the other hand, there were a multiplicity of viruses or a virus for each tumour, the insuperable theoretical difficulties were only met by Gye's view as to the dual nature.

"What was required in this field of inquiry was some method of definitely recognising a virus. Another all-important question was whether there was a filtrable agent in an artificially produced fowl tumour as contrasted with a naturally occurring tumour such as the Rous sarcoma. The domain of viruses as pathogenic agents was gradually being extended by investigation, and some definite tumours had been shown to be caused by them: a recent example was the work by Peyton Rous and Beard (detailed in the *Journal of Experimental Medicine*, 1934, lx) on Shope's infective papilloma of the cotton-tail rabbit in America—a growth undoubtedly caused by a virus. A question which remained unanswered was whether the malignancy of the epithelioma—that is, the uncontrolled proliferation of its cells—depended upon the presence of the virus, or whether the virus produced malignancy as other carcinogenic agents might do, the virus merely persisting in the malignant growth. In other words, if the virus could in some way be removed from the epithelioma, would malignancy persist or come to an end?

The Conflict of Theories

"The lecturer thought there was no valid evidence that malignancy in general was produced by a virus or viruses entering the body from outside. Experimental facts appeared to exclude that possibility. Malignant growths could be set up by carcinogenic agents so regularly, not only when applied externally but when introduced into the tissues, that the access of a virus from without on each occasion seemed impossible. The conclusion appeared to be inevitable that if a virus was necessary for

malignancy it must be present within the normal tissues in the interior of the body and act only when proliferation had been previously set up by carcinogenic agents or in some other way. It was a hypothesis on which nothing definite could be said. No one could prove or disprove the presence of a virus in normal tissues ready to produce malignancy when occasion offered.

"Both theories—that malignancy was the result of a change in the mechanism of the cell, or that it was due to the presence of a virus—had their strong supporters, but a decision was not to be arrived at by the votes of 'authorities.' On either view there seemed to be a failure on the part of nature. In the one case normal proliferative processes evolved for defence and repair passed into malignancy, in the other the animal body had somehow come to harbour a virus which, given opportunity, led to its destruction.

"'The fact that the problem as to the essential nature of malignancy has not been solved has unjustifiably obscured what has actually been achieved. That malignancy may supervene on cellular proliferation brought about in various ways, by irritants, cell stimuli, and hormones, and as a result of compensatory hyperplasia; that in most cases a long period elapses between the onset of proliferation and malignancy; that in the case of chemical substances the tendency to institute malignancy is in certain instances related to molecular structure; that inherited susceptibility plays an important part, especially in certain organs; that the development of malignancy depends in some cases upon congenital abnormalities; and that these factors may be combined in different ways—these are facts which have been completely established. Knowledge of causes brings with it the possible means of prevention, and has already been effective.'

"Sir Robert Muir concluded on a note of hopefulness. Fresh stimulus had been supplied by recent advances. Much was being learned from a close co-operation between clinical observers and pathologists. Workers in any one field naturally pushed the implication of their results to the full, but all results must be co-ordinated and tested in relation to the fundamental questions. The picture he had tried to present had come chiefly from researches in the last 25 years. He had little doubt that in the next quarter of a century it would be greatly changed, and that what he had brought forward in his lecture would be only a record of what had been."

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At a recently-held meeting of the directors of the Highland and Agricultural Society approval was given to the renewal of the grant of £200 which had been given for the past ten years to the Animal Diseases Research Association, and also the grant of £100 to the Glasgow Veterinary College, which had been given for the past six years.

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Veterinary inspection of auctions in Shropshire is to be carried out, recommendations to this effect having been adopted by the Salop County Council. Certain auction markets in the county are to be inspected each auction day, whilst others, including those of Ellesmere and Whitchurch, are to receive periodical inspection.

The Editor acknowledges, with thanks, the receipt of communications from the following: Messrs. E. F. McCleery (Leeds) and Henry Taylor (Haywards Heath), Colonel G. K. Walker (Abingdon).

R.C.V.S. COUNCIL ELECTION

To Fellows and Members of the R.C.V.S.

Ladies and Gentlemen,—I have been asked by the Yorkshire Division of the National Veterinary Medical Association to offer myself as a candidate at the forthcoming election of the Council of the Royal College of Veterinary Surgeons, and after giving the matter mature consideration, I have decided to stand.

If elected, it will be my earnest endeavour to serve the profession to the best of my ability, devoting to the duties that amount of time and consideration which the position requires.

Members may rest assured that I have at heart the interest of all sections of the profession, and that all questions affecting the profession, ethical and educational, will be approached by me with an impartial and unbiased mind.

Yours faithfully,
Arthur H. Watson, M.R.C.V.S.

Veterinary Infirmary,
39, Lower Rushton Road,
Bradford.

May 16th, 1936.

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To the Fellows and Members of the R.C.V.S.

Ladies and Gentlemen,—Having accepted the invitation of the Lancashire Veterinary Medical Association to offer myself as a candidate for election to the Council of the Royal College of Veterinary Surgeons, I wish to state:

I am a general practitioner, my livelihood depending entirely on my practice, and after an extended period of State employment, I appreciate more fully than the majority (I think I can safely say) the value of, and hold a very definite view on, the necessity for an increased number of independent practitioners.

This point, I am strongly of the opinion, is absolutely essential if we are to progress as a profession of economic importance to the country, and to our own prosperity.

An appreciation of the administrative duties, as apart from free service, in connection with the various Acts and Orders in force is obviously necessary, and as indicated by the policy of the Central Adminstration Authority, will react beneficially to the profession as a whole, and the individual in particular.

I am very strongly in favour of closer co-operation with all fields of the profession.

If my candidature is acceptable to a majority, I am prepared to give my time and thought to further the interests of the profession in general and the practitioner in particular, on the abovementioned broad lines of development.

G. C. Webster.

11, King Street,
Lancaster.

Advertiser's Announcement

"Novidol" for Skin Diseases

Bayer Products, Ltd., have pleasure in informing readers of this journal that the laboratories have succeeded in preparing an odourless skin dressing with an efficacy that places it in the first rank with "Odylen."

The product, which has been named "Novidol," will be sold alongside "Odylen" and its use is indicated in all cases where the pear-drop odour of "Odylen" is for any special reason considered undesirable.

"Novidol" is better tolerated by cats than "Odylen"; nevertheless, for these animals it should be diluted with olive oil (1:1) and partial dressings only given. For other animals "Novidol" is best used undiluted.

A 4-oz. complimentary package will be gladly forwarded on request.